Royal Botanic Gardens
Melbourne
2001
LIBRARY

The Orchadian

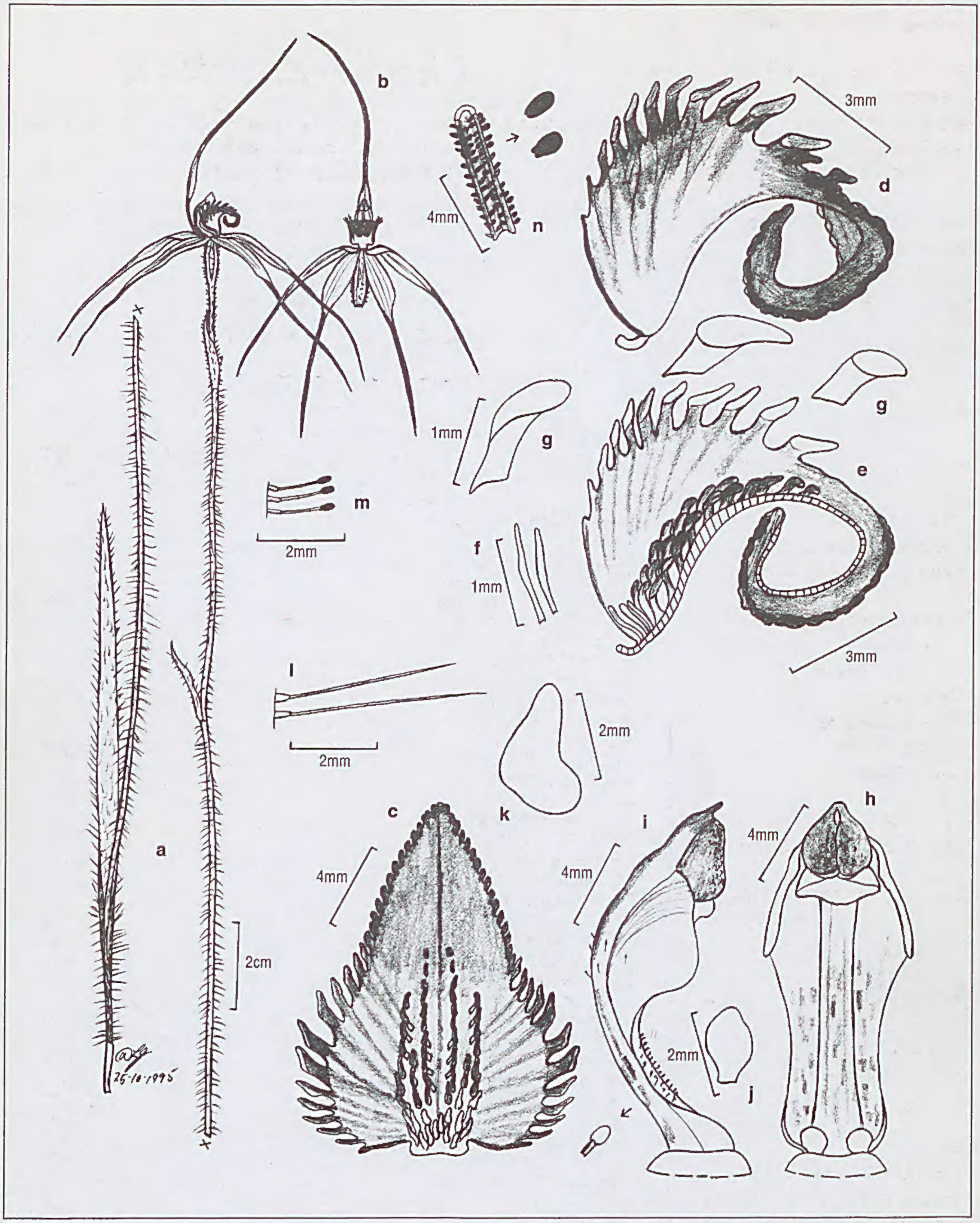
Volume 13, Number 9 www.anos.org.au September 2001

Official Journal of the Australasian Native Orchid Society

M.A. Clements

Caladenia flava

The type species of *Caladenia* from Margaret River, Western Australia



Arachnorchis sp. aff. _reticulata_, Lullworth – Tasmania.

(*J. Campbell 95010*)

a. plant; **b**. flower from front; **c**. labellum from above, flattened out; **d**. labellum from side; **e**. longitudinal section of labellum; **f**. basal lamina calli; **g**. lamina calli; **h**. column from front; **i**. column from side; **j**. column gland; **k**. pollinium; **l**. stem and leaf trichomes; **m**. ovary trichomes; **n**. section of sepaline cauda.

Drawing 25/10/1995 by D.L. Jones. ©

1 September 2001

SUBSCRIPTION RATES (AUD$)
$35 Australia
$40 Asia/Pacific
$45 Other Countries

COUNCIL OF ANOS Inc.
President:
Graham Slater
Vice-President:
John Riley
Secretary:
Ruth Rudkin
Treasurer:
Robert Murch

Editor, *The Orchadian*:
David P. Banks
39 Carole Street,
Seven Hills, NSW 2147.
dpbanks@ozemail.com.au

ANOS Councillors:
Irene Bodell
Graeme Bradburn
Terry Cooke
Peter Eygelshoven
George Hillman
Russell Wales

Conservation Officer:
Alan Dash; ☎ (02) 4384-2907

ANOS CORRESPONDENCE:
A.N.O.S. Inc. P.O. Box 318,
Willoughby, N.S.W. 2068
☎ (02) 4229-9751
☎ (02) 9416-4306

ARTICLES:
Items for consideration may be submitted to the Editor on disk or via e-mail using Microsoft Word™.
Good quality colour slides, prints or illustrations may be submitted with articles. All efforts will be made to return images after publication.

COPYRIGHT:
Material in *The Orchadian* is subject to copyright & may not be reproduced without permission from the author.

Royal Botanic Gardens
Melbourne
30 OCT 2001
LIBRARY

The Orchadian

Official Journal of The Australasian Native Orchid Society Inc.
Founded August 1963
www.anos.org.au
Dedicated to the Study and Conservation of Australasian Native Orchids
Print Post Approved PP239628/00002, ISBN 0474-3342
Patron; Walter T. Upton

CONTENTS

Volume 13 Number 9

Features

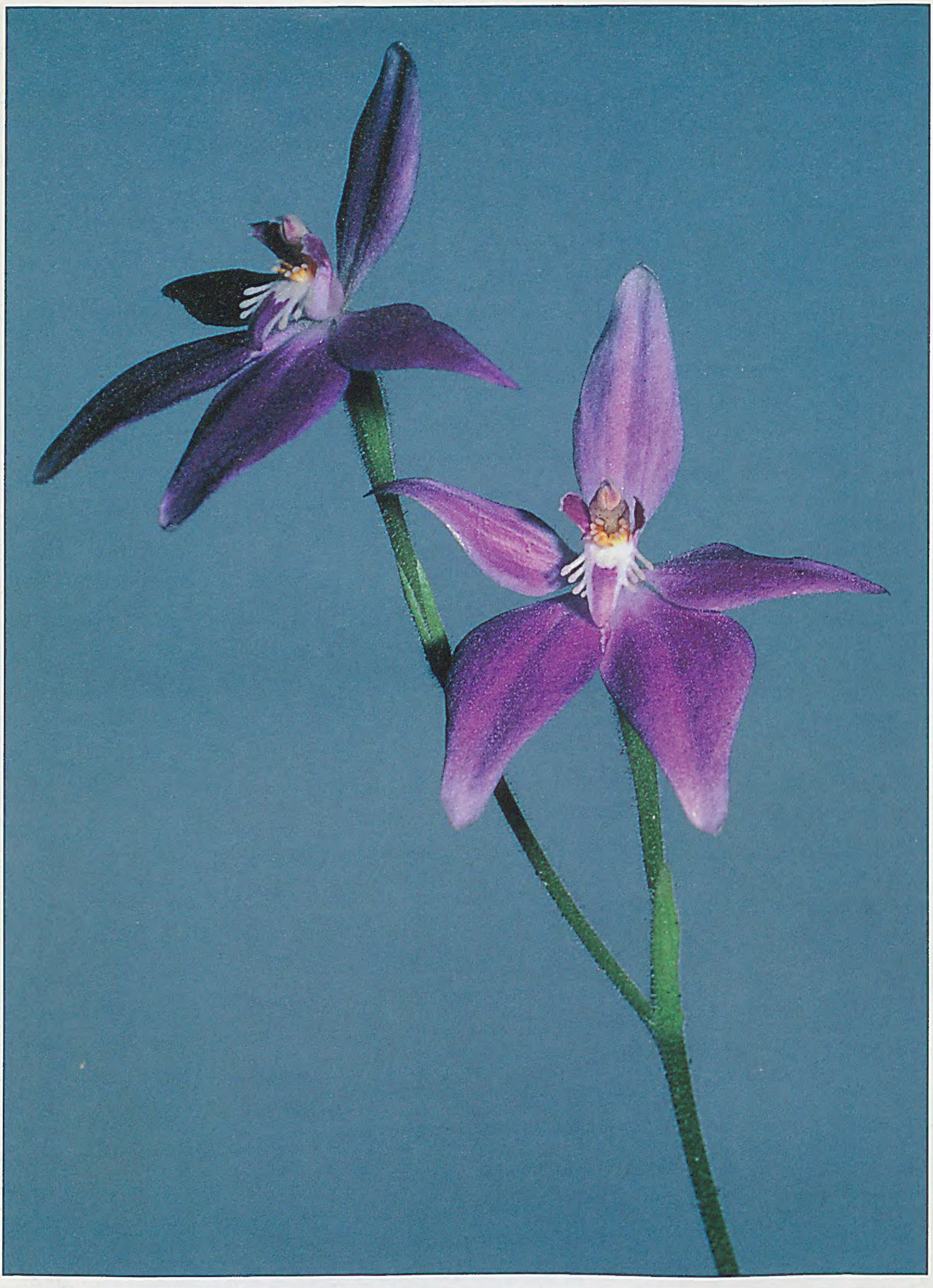
A New Classification of *Caladenia* R.Br. (Orchidaceae)
D.L. Jones, M.A. Clements, I.K. Sharma & A.M. Mackenzie 389
Oncophyllum, a New Genus of Orchidaceae from Australia
... ...D.L. Jones & M.A. Clements 420
A Bit About *Sarcochilus australis* ... ... G. Walsh 425

Colour Photographs

Caladenia flava ... ...Front Cover
Caladenia latifolia 388
Arachnorchis patersonii 398
Arachnorchis anthracina 398
Arachnorchis caudata 398
Arachnorchis tentaculata 398
Arachnorchis ensata 399
Arachnorchis infundibularis 399
Arachnorchis septuosa 399
Arachnorchis verrucosa 399
Arachnorchis discoidea 405
Arachnorchis conferta 405
Arachnorchis parva 405
Calonema filiferum 408
Calonema sanguineum 408
Calonema cairnsianum 408
Calonema multiclavium 408
Calonema roei 409
Cyanicula gemmata 412
Cyanicula sericea 412
Drakonorchis barbarossa 412
Drakonorchis mesocera 412
Elythranthera emarginata & *Elythranthera brunonis* 418
Glycorchis saccharata 418
Leptoceras menziesii 418
Petalochilus catenatus 419
Petalochilus pusillus 419
Praecoxanthus aphyllus 419
Pheladenia deformis 429
Stegostyla gracilis 429
Stegostyla congesta 429
Stegostyla cucullata 429
Arachnorchis longicauda ... ...Back Cover

Illustrations

Arachnorchis sp. aff. *reticulata* (line-drawing by D.L. Jones) 386
Arachnorchis rigens (line-drawing by D.L. Jones) 397
Calonema sanguineum (line-drawing by D.L. Jones) 401
Petalochilus chlorostylus (line-drawing by D.L. Jones) 407
Stegostyla sp. aff. *dimorpha* (line-drawing by D.L. Jones) 413
Oncophyllum minutissimum 422
Oncophyllum globuliforme 423



M.A. Clements

Caladenia latifolia

from Albany, Western Australia

A New Classification of *Caladenia* R.Br. (Orchidaceae)

David L. Jones, Mark A. Clements, Ish K. Sharma & Anne M. Mackenzie*
Centre for Plant Biodiversity Research,
GPO Box 1600, Canberra, ACT 2601, Australia.
***Research School of Biological Sciences, Australian National University,**
GPO Box 475, Canberra, ACT, 2601, Australia.

Abstract

A new classification is proposed for *Caladenia* (Orchidaceae). The genus is defined in the strict sense with the generic typification discussed in detail. The segregate genera *Cyanicula, Leptoceras* and *Praecoxanthus* are recognised; new genera *Arachnorchis, Glycorchis, Pheladenia* and *Stegostyla* are erected; *Petalochilus* is reinstated and *Calonema* and *Drakonorchis* are raised to generic rank. New combinations are made for all accepted species in these genera. A key is presented to the genera in the *Caladenia* alliance.

Introduction

The genus *Caladenia* R.Br. has been the focus of morphological studies by the senior author over many years (Jones 1991, 1994, 1996, 1997, 1999, 2000, 2001, Jones *et al* 1997, Jones & Clements 1999) and a supportive morphological study was published in conjunction with a thesis on reproductive biology (Clements 1995). Further morphological studies, as yet unpublished, show considerable discontinuities within *Caladenia*, including the existence of some readily recogniseable natural groups. The various species, which form each natural group, share a number of morphological characters, suggesting that, as a group, they could be recognised infragenerically or at a higher rank.

Recently the generic concepts of *Caladenia* have been modified by the reinstatement of *Leptoceras* and the erection of the segregate genera *Cyanicula* and *Praecoxanthus* (Hopper & Brown 2000). Hopper and Browns' concept of *Caladenia sens. str.* was made clear in their paper when they also created the new subgenera *Calonema, Drakonochis* and *Elevata,* within *Caladenia*. Of these, *Calonema* is illegitimate since the authors attributed section *Calonema* to Bentham (1873) instead of Lindley (1840a) and *Caladenia patersonii* R.Br., stated by them to be the type of the new subgenus, was not included in Lindley's protologue. We have been awaiting the publication of further studies into Western Australian species of the genus (Hopper & Brown in press) before proceeding with our classification.

The publication of the paper by Szlachetko (2001) has brought forward the presentation of our classification of *Caladenia.* In his paper Szlachetko raised the sections *Phlebochilus, Calonema* and *Pentisea* to generic rank and erected the genus *Jonesiopsis.* Of these, *Phlebochilus* and *Calonema* are invalid since a type was not designated, *Pentisea* is a synonym of *Cyanicula* (Hopper and Brown 2000) and *Jonesiopsis* is illegitimate since the genus *Jonesyella* was published as a new genus simultaneously as the type of *Jonesiopsis.* Szlachetko also described section *Caladeniastrum* within *Caladenia* to accommodate the *C. flava* R.Br. group. This group was treated by Hopper & Brown as subgenus *Elevata* of *Caladenia.*

In our opinion the studies of Hopper and Brown are sound, being based on familiarity with the genera garnered from many years of field work and herbarium studies. However the same cannot be said about the superficial studies, and resultant seemingly hastily compiled publication of Szlachetko. His treatment, which appears to be based on a very limited range of herbarium specimens, is superficial, skeletal and indicates a lack of basic knowledge of the orchid groups involved. Not only were nomenclatural changes made which are illegitimate but new combinations were created for some taxa which have generally been placed in synonymy. In *Calochilus,* the section *Imberborkis* was erected for a single taxon, which is nothing but a pelorial freak. It is a great pity that Szlachetko's publication, appearing at this time and apparently based on the taxonomic concepts of Jones (2001), has pre-empted results obtained through the research programs of two groups of Australian workers based on years of study and rigorous scientific research. Papers such as Szlachetko (2001), containing numerous errors of fact, result in substantial nomenclatural and taxonomic confusion and nomenclatural instability, which then needs to be clarified by additional publications based on sound research. A number of examples are included in this paper where we have attempted to clarify these inaccuracies and clearly document the nomenclature and typification for all the relevant taxa.

Our studies into the Caladeniinae have more or less parallelled those of Hopper and Brown, but we have a different generic concept, and extra evidence to support the ranking given to the natural groups mentioned above has been obtained from molecular studies (Clements *et al.* in press). Analysis of DNA sequence data from the internal transcribed spacer of nuclear ribosomal DNA (nrITS) (Fig. 1) supports the morphological view that the current interpretation of genera within the Caladeniinae requires some adjustments. New genera in the *Caladenia* alliance are the subject of this paper.

Materials and Methods

This study is based on the examination of fresh plant material and dried and spirit herbarium specimens from AD, AK, BM, BRI, CANB, E, HO, K, L, LINN, MEL, NSW, P, W and WELT. Wherever possible all pertinent types, or photographs thereof, have been examined. Representative taxa, comprising c. 70 species, including those from all major taxonomic lines within the Caladeniinae, were used in the molecular study. The choice of outgroups was based on results of molecular analyses of the Diurideae (Clements *et al*, in press). Fresh leaf samples from plants of known provenance were used where possible or rarely material was sampled from herbarium specimens or from floral dissection cards. All collections were vouchered, the majority being deposited at the Australian National Herbarium (CANB) or at the Landcare Research Herbarium, Lincoln (CHR). The methods used for DNA extraction and sequencing is outlined in Clements *et al.* (in press). This paper also includes details of the vouchers used in the study.

Results and Discussion

Analysis of a computer based alignment, with final manual adjustment, of 683 nucleotide sites of which 258 were potentially parsimony-informative, produced 35 equally parsimonious trees; tree length = 1052; consistency index (CI) = 0.4629; consistency index excluding uninformative characters = 0.3983; retention index (RI) = 0.5647; and rescaled consistency index (RC) = 0.2614. Successive weighting (SW) produced one equally parsimonious tree; tree length = 654; consistency index (CI) = 0.7339; consistency index excluding uninformative characters = 0.6766; retention index (RI) = 0.8346; and rescaled consistency index (RC) = 0.6126, and the single tree is shown in Figure 1.

The results show a clear phylogenetic structure within the Caladeniinae with the isolation of taxa into monophyletic groups supporting our conclusions based on morphology and those of Hopper & Brown (2000). *Leptoceras* is isolated from other taxa within the Caladeniinae and *Praecoxanthus* is also clearly isolated and sister to the rest of the Caladeniinae. The remaining taxa fall into three main groups.

Group 1 contains *Cyanicula deformis, Glossodia* and *Elythranthera* and whilst the bootstrap values for *Glossodia* are poor, nevertheless the three taxa are clearly identifiable as separate entities. The position of *Elythranthera* and *Glossodia* adjacent to each other lends support to the traditional interpretation that these genera are closely related. Indeed, *Elythranthera* was first described as a section of *Glossodia* (Endlicher 1846), based on similarity of floral features, but it was not until 1963 that they were treated formally as separate genera (George 1963). *Cyanicula deformis* (formerly *Caladenia deformis*), also situated within this group, is sister to but well isolated from *Elythranthera* and *Glossodia,* thus rendering *Cyanicula* paraphyletic. The unusual floral morphology of *Cyanicula deformis* supports its separation from *Cyanicula*, here described as a new genus *Pheladenia.*

Group 2 contains the remaining species in *Cyanicula* plus *Caladenia saccharata* which is both isolated and sister to it. *Caladenia saccharata* was considered by Hopper & Brown in Hoffman & Brown (1992, 1998) to be distinct from *Cyanicula* on account of its white flowers. These molecular analyses show that although related to *Cyanicula*, it is still well separated with reasonable support for its recognition as a separate taxon, here proposed as *Glycorchis*.

Group 3 is the largest group containing six isolated and well supported (80-100% bootstrap values) monophyletic groups. These groups are morphologically distinct and in some respects reflect the groupings in some earlier classification attempts in *Caladenia*. For the most part these six groups correlate with informal species groupings based on gross morphology which have been used in some regional treatments of *Caladenia*, eg. Jones (1988), Hoffman & Brown (1992, 1998), Bishop (1996). Thus the small-flowered species such as *C. carnea, C. alata* and *C. catenata* cluster together in a very strongly supported (100% bootstrap support) group, the generic name *Petalochilus* reinstated here for them. This group in turn is sister to, well isolated from and well supported (98% bootstrap support) from another small-flowered group (here proposed as *Stegostyla*) containing *C. lyallii* and *C. congesta* with a strongly inarched dorsal sepal. The "*flava*" group, which is likewise isolated from the remainder of *Caladenia*, can be distinguished by its unique calli. Sister to these is the "*filifera*" group with long thread-like filamentous sepals and petals and also containing some divergent species. The *Drakonorchis* group, which has unique floral morphology, although not that far removed from the remaining larger-flowered taxa, is easily recognised and well supported (80% bootstrap values). This group has long been recognised as distinct (Hopper & Brown in Hoffman & Brown 1992, 1996) but was recognised at subgeneric level in a recent treatment (Hopper & Brown 2000). The remaining large group, which is also well supported (89% bootstrap support), contains species commonly referred to as "Spider Orchids", here recognised as *Arachnorchis*.

These results provide a sound basis for the recognition of all these taxa at a higher rank. Because all are distinct morphologically and easily recognisable, such as the traditional treatment of *Glossodia* and *Elythranthera*, we have chosen to treat them at generic rank.

The typification of *Caladenia* R.Br.

Caladenia was erected by Robert Brown (1810), including 13 species one of which was *C. flava* R.Br., but no type was designated. In the same publication he described the section *Leptoceras* which included *C. menziesii* R.Br. and *C. macrophylla* R.Br. Lindley (1840a - 1 Jan. 1840) described extra species as well as sections *Eucaladenia, Pentisea* and *Calonema* and raised *Leptoceras* to generic rank. Later in the same year (1840b - Feb. 1840) Lindley reaffirmed his concept of these sections in *Caladenia* and described some extra species, but at no stage did he designate types for his sections. Bentham (1873) recognised five sections in *Caladenia*, including *Leptoceras*, and Lindley's three sections, as well as describing the new section *Phlebochilus*. He likewise did not designate types for the sections.

Because it was generally believed that the type of *Caladenia* had not been designated (Farr *et al.* 1979), Hallé (1977) chose *C. catenata* (Sm.) Druce as the type. This choice was illegitimate since the species was not included in Brown's protologue. Later, Clements (1989) chose *C. carnea* R.Br. as the type. However, in a publication which has recently come to our notice, Pfitzer (1889) clearly selected *C. flava* R.Br. as the type of section *Eucaladenia*. This automatically means that *C. flava* is the type species of *Caladenia*, predating the designation by Clements. This revelation greatly affects the interpretation of *Caladenia sens. str.* and contrasts to accepted use.

Taxonomy

1. *Caladenia* R.Br., *Prod.* 323 (1810).

Type species: *Caladenia flava* R.Br. (*fide* Pfitzer 1889).

Caladenia R.Br. sect. *Caladenia* (= *Eucaladenia* Lindl. in *Edwards's, Bot. Reg.*, 1-23: *Swan Riv. Append.* li (1840)).

Caladenia R.Br. subgenus *Elevata* Hopper & A.P.Br., *Lindleyana* 15(2): 124-126 (2000). Type species: *Caladenia flava* R.Br.

Caladenia R.Br. sect. *Caladeniastrum* D.L.Szlatcheko, *Polish Bot. J.* 46(1): 15 (2001). Type species: *Caladenia flava* R.Br.

Etymology

Derived from the Greek *calos*, beautiful and *aden*, gland, referring to the prominent, often colourful calli on the labellum.

Recognition

Recognised by the habit of growing in clonal colonies arising from the production of daughter tubers on stolonoid roots. Also linear, elongate labellum calli which lack an expanded head, these calli being clustered, with their bases fused to form a plate-like structure, on the proximal part of the labellum. Additionally the apical part of column wings have a short, free lobule; and the anther has a long rostrum.

Distribution

A genus of six species endemic in southern Australia.

Species

Caladenia flava R. Br., *Prod.* 324 (1810).

Caladenia latifolia R. Br., *Prod.* 324 (1810).

Caladenia marginata Lindl. in *Edwards's, Bot. Reg.* 1-23: *Swan Riv. Append.* li (1840).

Caladenia nana Endl. in *Lehm., Pl. Preiss.* 2: 7 (1846).

Caladenia reptans Lindl. in *Edwards's, Bot. Reg.* 1-23: *Swan Riv. Append.* lii (1840).

Caladenia unita Fitzg., *Gard. Chron.* (new ser.) 17: 461 (1882).

2. *Arachnorchis* D.L.Jones et M.A.Clem., ***gen. nov.*** Affinis *Caladeniae* R.Br. sed trichomibus multiseriatis, eglandularibus, quoque cellula basali longa, albo; floribus arachneis; caudis tepalinis, attenuatis vel in structuris tumidis et claviformibus, cellulis osmophoris specialis faciuntur; columna structuris basalis paribus, glanduliformibus, differt.

Type species: *Caladenia patersonii* R.Br.

Phlebochilus (Lindl.) D.L.Szlachetko, *Polish Bot. J.* 46(1): 14 (2001), *pro parte, nom. illeg.*

Etymology

Derived from the Greek *arachne*, spider and *Orchis*, another genus of Orchidaceae but also used generally for any orchid. Spider orchid is the vernacular commonly applied to these orchids.

Recognition

Distinguished morphologically from *Caladenia* R.Br. by the presence on the leaf and scape of multiseriate, eglandular trichomes each with a long white basal cell; large flowers with attenuate tepals in which the tips are extended into caudae or thickened into club-like units, both structures of which bear specialised, hemispheric to globose osmophore cells. Additionally the column has a pair of prominent, usually yellow, gland-like structures at the base.

Distribution

A genus of about 150 species endemic in Australia.

New combinations:

Arachnorchis actensis (D.L.Jones et M.A.Clem.)D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia actensis* D.L.Jones et M.A.Clem., *Orchadian* 12(11): 522-523, f., t. (1999).

Arachnorchis aestiva (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia aestiva* D.L.Jones, *Austral. Orch. Res.* 2: 14-15, f. 14, t. (1991).

Arachnorchis amnicola (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia amnicola* D.L.Jones, *Orchadian* 12(4): 166-170, f. (1997).

Arachnorchis amoena (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia amoena* D.L.Jones, *Muelleria* 8(2): 177-178, f. 2a-c (1994).

Arachnorchis anthracina (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia anthracina* D.L.Jones, *Austral. Orch. Res.* 3: 21-22, f. 2.2, t. 4 (1998).

Arachnorchis arenaria (Fitzg.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia arenaria* Fitzg., *Austral. orch.* 1(7): [t. 8] (1882).

Arachnorchis argocalla (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia argocalla* D.L.Jones, *Austral. Orch. Res.* 2: 15-16, f. 15 (1991).

Arachnorchis atroclavia (D.L.Jones et M.A.Clem.)D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia atroclavia* D.L.Jones et M.A.Clem., *Austrobaileya* 2(5): 547-553 (1988).

Arachnorchis audasii (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia audasii* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 51: 295 (1927).

Arachnorchis australis (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia australis* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 2 (1991).

Arachnorchis behrii (Schldl.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia behrii* Schldl., *Linnaea* 20: 569 (1847).

Arachnorchis brachyscapa (G.W.Carr.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia brachyscapa* G.W.Carr, *Muelleria* 6(6): 439-442, f. 1 (1988).

Arachnorchis brumalis (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia brumalis* D.L.Jones, *Austral. Orch. Res.* 2: 17, f. 17 (1991).

Arachnorchis bryceana (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia bryceana* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 54: 46 (1930).

Arachnorchis calcicola (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia calcicola* G.W.Carr, *Muelleria* 6(3): 185-191, f. 1 (1986).

Arachnorchis callitrophila (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia callitrophila* D.L.Jones, *Orchadian* 13(1): 5-6, f. 1, t. (1999).

Arachnorchis cardiochila (Tate) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia cardiochila* Tate, *Trans. & Proc. Roy. Soc. South Australia* 9: 60, t. 2 (1887).

Arachnorchis caudata (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia caudata* Nicholls, *Victorian Naturalist* 64: 231 (1948).

Arachnorchis clavigera (A.Cunn. ex Lindl.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia clavigera* A.Cunn. ex Lindl., *Gen. sp. orchid. pl.* 422 (1840).

Arachnorchis clavula (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia clavula* D.L.Jones, *Austral. Orch. Res.* 2: 18-19, f. 19 (1991).

Arachnorchis colorata (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia colorata* D.L.Jones, *Austral. Orch. Res.* 2: 21, f. 22 (1991).

Arachnorchis concinna (Rupp) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia dilatata* R.Br. var. *concinna* Rupp, *Proc. Linn. Soc. New South Wales* 53: 554 (1928); *Caladenia concinna* (Rupp) D.L.Jones et M.A.Clem., *Austral. Orch. Res.* 1: 22 (1989).

Arachnorchis concolor (Fitzg.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia concolor* Fitzg., *Austral. orch.* 1(7): [t. 8] (1882).

Arachnorchis conferta (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia conferta* D.L.Jones, *Austral. Orch. Res.* 2: 21-22, f. 23 (1991).

Arachnorchis corynephora (A.S.George.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia corynephora* A.S.George, *Nuytsia* 1(2): 158 (1971).

Arachnorchis crebra (A.S.George.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia crebra* A.S. George, *Nuytsia* 1(2): 160 (1971).

Arachnorchis cruciformis (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia cruciformis* D.L.Jones, *Orchadian* 13(1): 10-11, f.3 (1999).

Arachnorchis dienema (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia dienema* D.L.Jones, *Austral. Orch. Res.* 3: 28-29, f. 2.5 (1999).

Arachnorchis dilatata (R.Br.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia dilatata* R.Br., *Prod.* 325 (1810)

Arachnorchis discoidea (Lindl.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia discoidea* Lindl. in *Edwards's, Bot. Reg.* 1-23: *Swan Riv. Append.* lii (1840).

Arachnorchis drummondii (Benth.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia drummondii* Benth., *Fl. Austral.* 6: 383 (1873).

Arachnorchis echidnachila (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia echidnachila* Nicholls, *Pap. & Proc. Roy. Soc. Tasmania* for 1932: 13, t. 6 (1933).

Arachnorchis ensata (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia ensata* Nicholls, *Victorian Naturalist* 64: 138, f. (1947).

Arachnorchis falcata (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia dilatata* R. Br. var. *falcata* Nicholls, *Victorian Naturalist* 65: 268, f. (1949); *Caladenia falcata* (Nicholls) M.A.Clem. et Hopper, *Austral. Orch. Res.* 1: 24 (1989).

Arachnorchis ferruginea (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia ferruginea* Nicholls, *Victorian Naturalist* 64: 136, f. (1947).

Arachnorchis fitzgeraldii (Rupp) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia fitzgeraldii* Rupp, *Victorian Naturalist* 58: 199 (1942).

Arachnorchis flavovirens (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia flavovirens* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 4-5 (1991).

Arachnorchis formosa (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia formosa* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 4 (1991).

Arachnorchis fragrantissima (D.L.Jones et G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia fragrantissima* D.L.Jones et G.W.Carr, *Austral. Orch. Res.* 1: 24 (1989).

Arachnorchis fulva (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia fulva* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 7-8 (1991).

Arachnorchis gladiolata (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia gladiolata* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 31: 210, t. 26 (1907).

Arachnorchis graminifolia (A.S.George) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia graminifolia* A.S.George, *Nuytsia*, 1(2): 162, f. 3 (1971).

Arachnorchis hastata (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia patersonii* R.Br. var. *hastata* Nicholls, *Victorian Naturalist* 58: 115-6, f. F-J (1941); *Caladenia hastata* (Nicholls) Rupp, *Victorian Naturalist* 58: 197-8 (1942).

Arachnorchis helvina (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia helvina* D.L.Jones, *Austral. Orch. Res.* 2: 26-27, f. 30 (1991).

Arachnorchis hirta (Lindl.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia hirta* Lindl. in *Edwards's, Bot. Reg.* 1-23: *Swan Riv. Append.* lii (1840).

Arachnorchis huegelii (Rchb.f.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia huegelii* Rchb.f., *Beitr. Syst. Pflanzenk.* 66 (1871).

Arachnorchis infundibularis (A.S.George) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia infundibularis* A.S.George, *Nuytsia* 5(1): 55-6, t. 1, E-I (1984).

Arachnorchis insularis (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia insularis* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 8 (1991).

Arachnorchis integra (E.Coleman) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia integra* E.Coleman, *Victorian Naturalist* 49: 246, f. (1933).

Arachnorchis leptochila (Fitzg.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia leptochila* Fitzg., *Gard. Chron.* (new ser.) 17: 462 (1882).

Arachnorchis leptoclavia (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia leptoclavia* D.L.Jones, *Austral. Orch. Res.* 2: 27-28, f.31 (1991).

Arachnorchis lindleyana (Rchb.f.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia patersonii* R.Br. var. *lindleyana* Rchb.f., *Beitr. Syst. Pflanzenk.* 66 (1871); *Caladenia lindleyana* (Rchb.f.) M.A.Clem.et D.L.Jones, *Austral. Orch. Res.* 1: 27 (1989).

Arachnorchis lobata (Fitzg.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia lobata* Fitzg., *Gard. Chron.* (new ser.) 17: 461 (1882).

Arachnorchis longicauda (Lindl.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia longicauda* Lindl. in *Edwards's, Bot. Reg.* 1-23: *Swan Riv. Append.* lii (1840).

Arachnorchis longiclavata (E.Coleman) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia longiclavata* E.Coleman, *Victorian Naturalist* 46: 196, f. (1930).

Arachnorchis lowanensis (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia lowanensis* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 9 (1991).

Arachnorchis macroclavia (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia macroclavia* D.L.Jones, *Austral. Orch. Res.* 2: 28-29, f.32 (1991).

Arachnorchis macrostylis (Fitzg.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia macrostylis* Fitzg., *Gard. Chron.* (new ser.) 17: 462 (1882).

Arachnorchis magniclavata (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia magniclavata* Nicholls, *Victorian Naturalist* 64: 135, f. (1947).

Arachnorchis magnifica (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia patersonii* R.Br. var. *magnifica* Nicholls, *Victorian Naturalist* 52: 167 (1936); *Caladenia magnifica* (Nicholls) D.L.Jones et G.W.Carr, *Austral. Orch. Res.* 1: 27 (1989).

Arachnorchis montana (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia montana* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 10 (1991).

Arachnorchis necrophylla (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia necrophylla* D.L.Jones, *Austral. Orch. Res.* 2: 29, f.33 (1991).

Arachnorchis oenochila (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia oenochila* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 11-12 (1991).

Arachnorchis orientalis (G.W.Carr) D.L.Jones et M.A.Clem., *comb. et stat. nov.*
Basionym: *Caladenia fragrantissima* D.L.Jones et G.W.Carr subsp. *orientalis* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 6-7 (1991).

Arachnorchis ovata (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.* Basionym: *Caladenia ovata* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 33: 16-17, t. 1 (1909).

Arachnorchis pallida (Lindl.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia pallida* Lindl., *Gen. sp. orchid. pl.* 421 (1840).

Arachnorchis parva (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia parva* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 12-13 (1991).

Arachnorchis patersonii (R.Br.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia patersonii* R.Br., *Prod.* 324 (1810).

Arachnorchis pectinata (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia pectinata* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 47: 341 (1920).

Arachnorchis phaeoclavia (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia phaeoclavia* D.L.Jones, *Austral. Orch. Res.* 2: 29-30, f.34 (1991).

Arachnorchis pilotensis (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia pilotensis* D.L.Jones, *Orchadian* 13(1): 15-16, f.5, t. (1999).

Arachnorchis plicata (Fitzg.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia plicata* Fitzg., *Gard. Chron.* (new ser.) 17: 461 (1882).

Arachnorchis pumila (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia pumila* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 46: 152 (1922).

Arachnorchis radiata (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia radiata* Nicholls, *Victorian Naturalist* 65: 267 (1949).

Arachnorchis reticulata (Fitzg.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia reticulata* Fitzg., *Gard. Chron.* (new ser.) 17: 462 (1882).

Arachnorchis rhomboidiformis (E. Coleman) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia dilatata* R.Br. var. *rhomboidiformis* E.Coleman, *Victorian Naturalist* 46: 197 (1930); *Caladenia rhomboidiformis* (E. Coleman) M.A.Clem. et Hopper, *Austral. Orch. Res.* 1: 30 (1989).

Arachnorchis richardsiorum (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia richardsiorum* D.L.Jones, *Austral. Orch. Res.* 2: 31-32, f.37 (1991).

Arachnorchis rigens (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia rigens* D.L.Jones, *Austral. Orch. Res.* 2: 32-33, f.38 (1991).

Arachnorchis rigida (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia rigida* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 54: 45 (1930).

Arachnorchis rileyi (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia rileyi* D.L.Jones, *Orchadian* 12(4): 164-66, f. (1997).

Arachnorchis robinsonii (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia robinsonii* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 13-14 (1991).

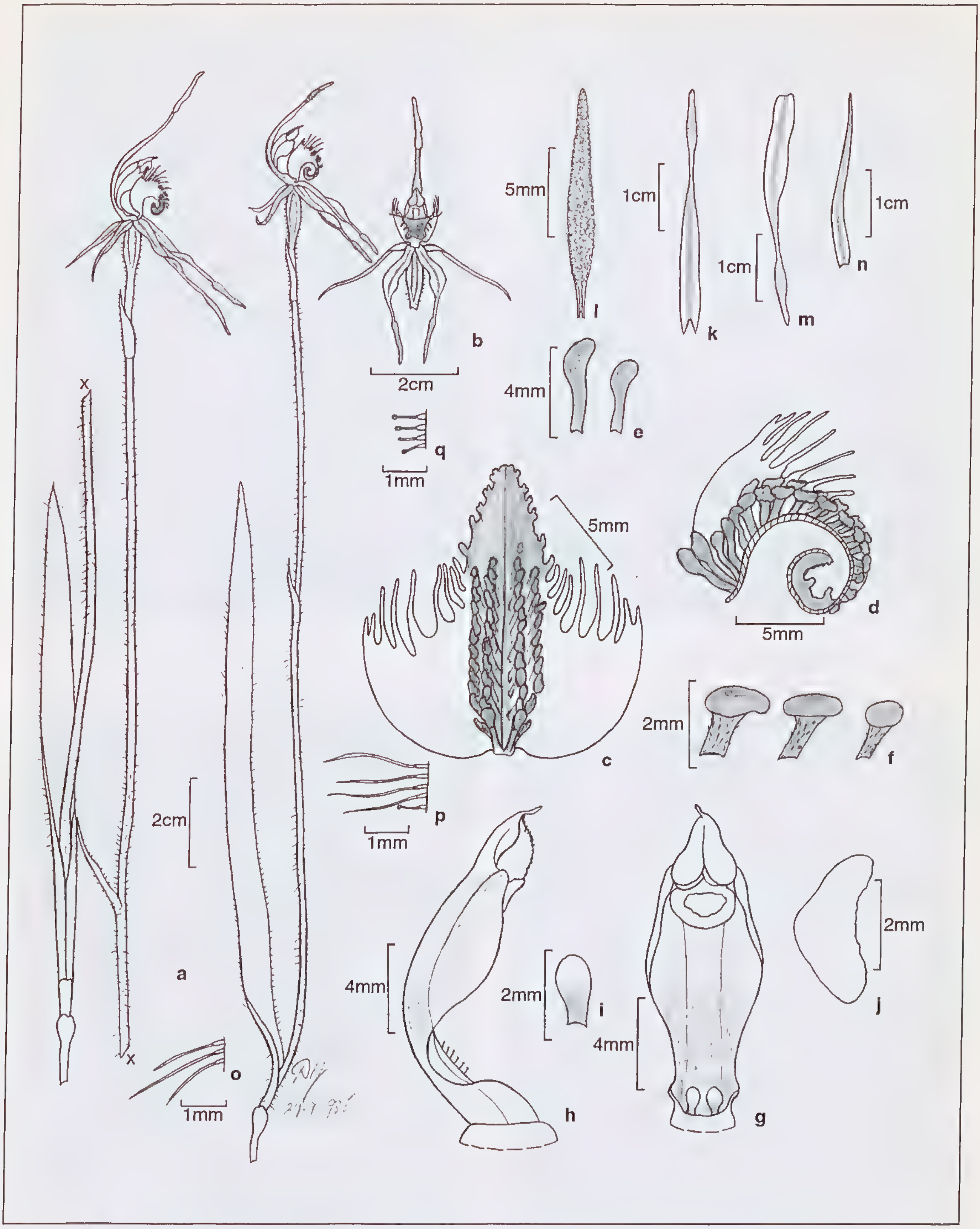
Arachnorchis rosella (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia rosella* G.W.Carr, *Muelleria* 6(6): 442-6, f. 2 (1988).

Arachnorchis saggicola (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia saggicola* D.L.Jones, *Austral. Orch. Res.* 3: 39-40, f. 2.11 (1999).

Arachnorchis septuosa (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia septuosa* D.L.Jones, *Austral. Orch. Res.* 2: 33, f.39 (1991).

Arachnorchis stellata (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia stellata* D.L.Jones, *Austral. Orch. Res.* 2: 33-34, f. 40 (1991).

Arachnorchis stricta (R.J.Bates) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia dilatata* R.Br. var. *stricta* R.J.Bates, *J. Native Orch. Soc. South Austral* 8(2): 23-25, f.S1-3 (1984); *Caladenia stricta* (R.J.Bates) R.J.Bates, *Orchadian* 8(12): 247-9, f. (1987).

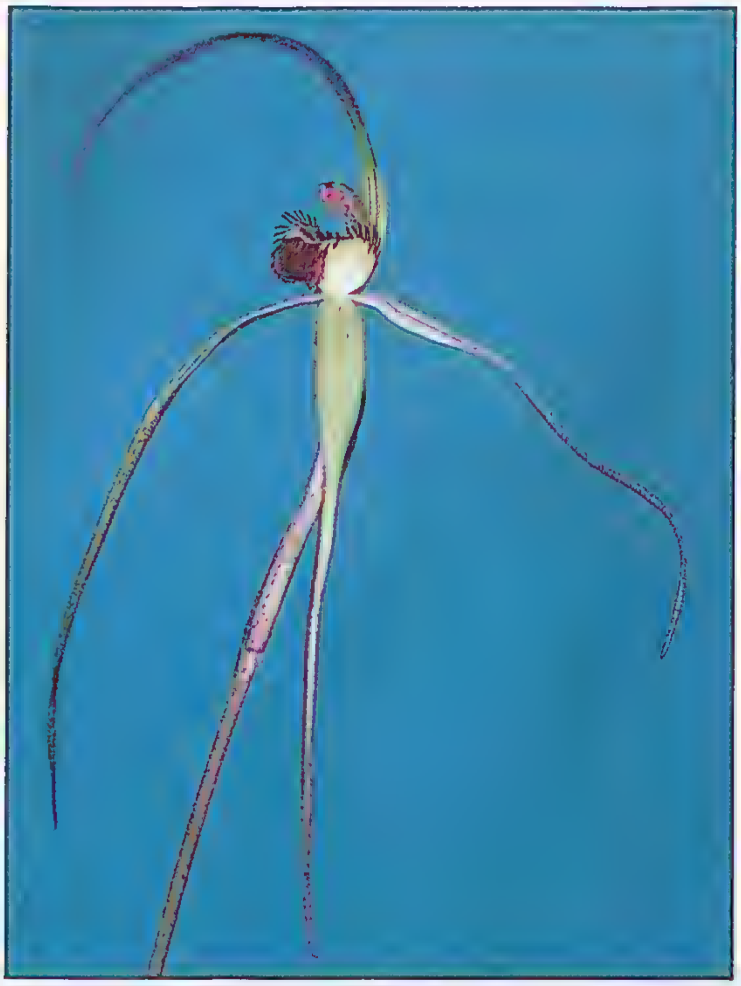


Arachnorchis rigens, **near Griffith – New South Wales.**

(*D.L.Jones 2846 & M.A.Clements*)

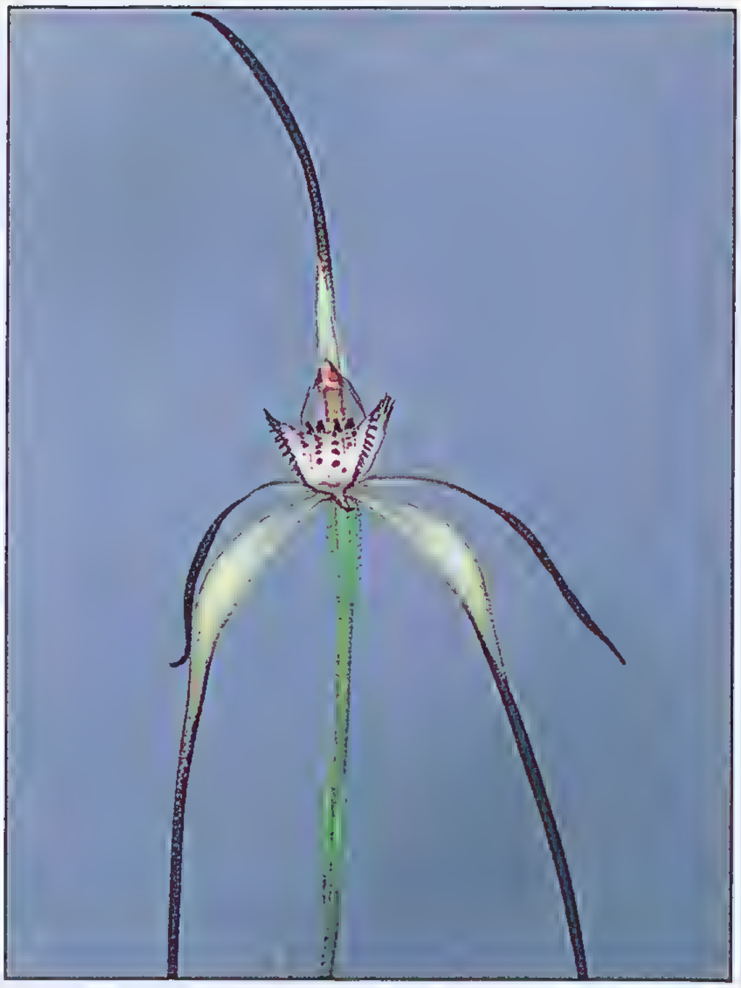
a. plants; **b**. flower from front; **c**. labellum from above, flattened out; **d**. longitudinal section of labellum; **e**. basal lamina calli; **f**. lamina calli; **g**. column from front; **h**. column from side; **i**. column gland; **j**. pollinium; **k**. dorsal sepal; **l**. sepaline osmophore; **m**. lateral sepal; **n**. petal; **o**. leaf trichomes; **p**. stem trichomes; **q**. ovary trichomes.

Drawing 29/9/1988 by D.L. Jones. ©



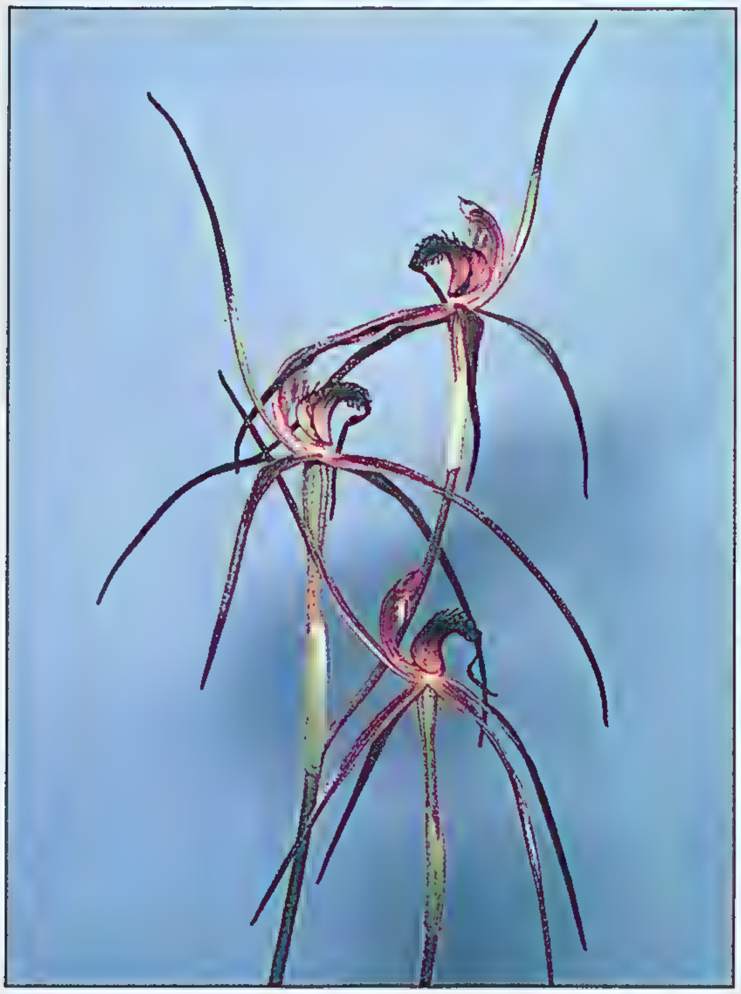
M.A. Clements

Arachnorchis patersonii
from Blackwood Creek, Tasmania



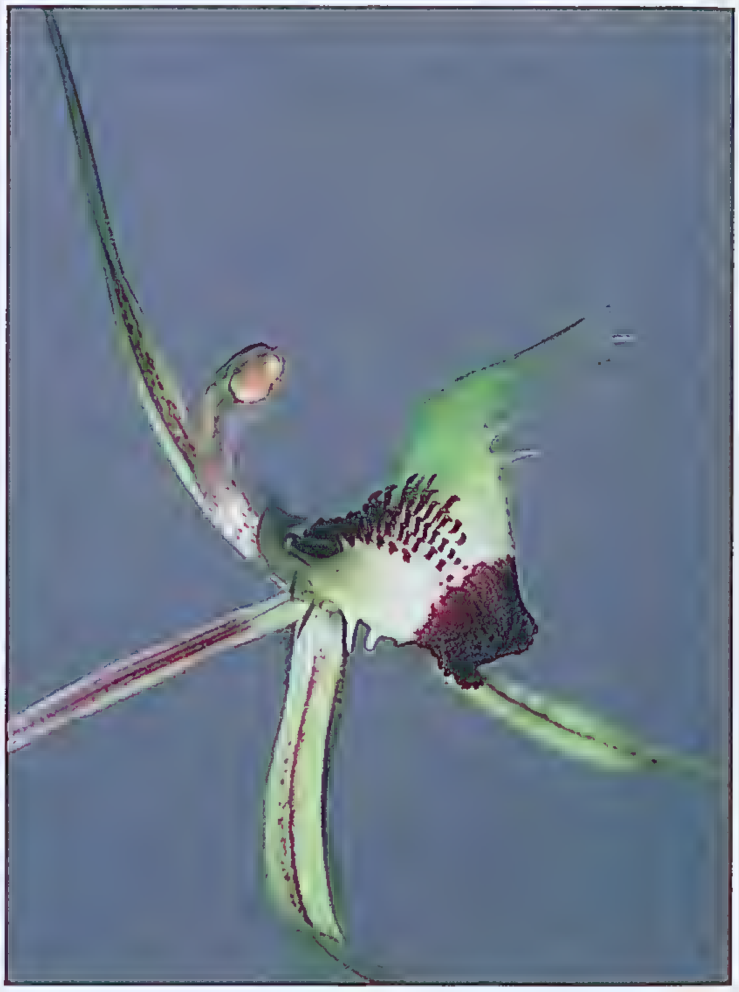
M.A. Clements

Arachnorchis anthracina
from Ross, Tasmania



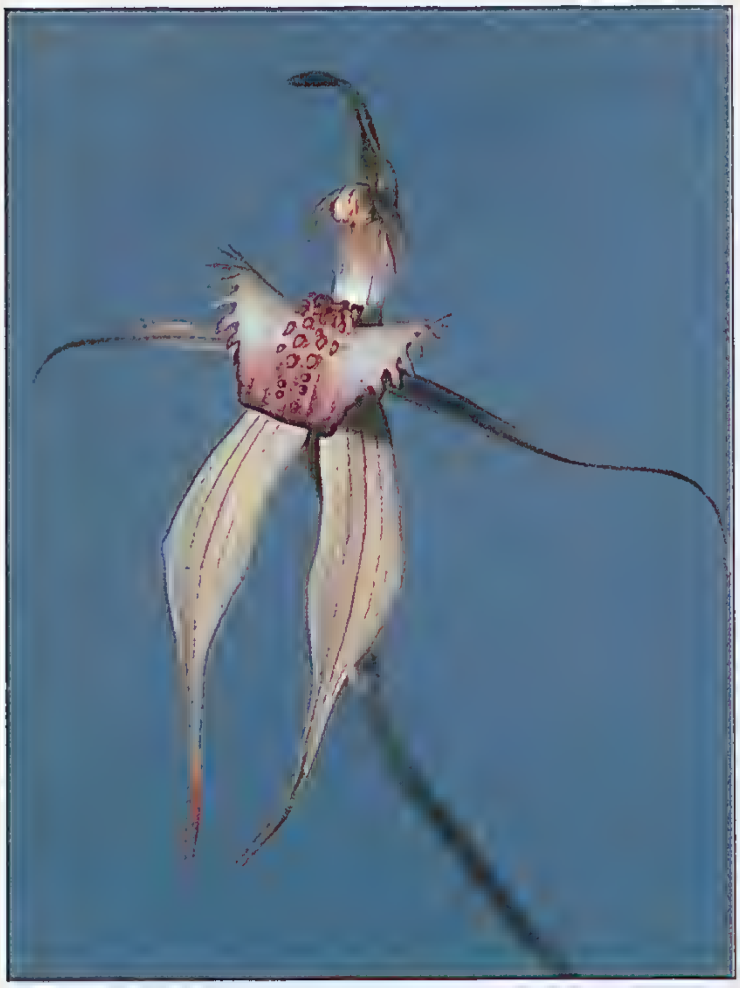
M.A. Clements

Arachnorchis caudata
from near Hobart, Tasmania



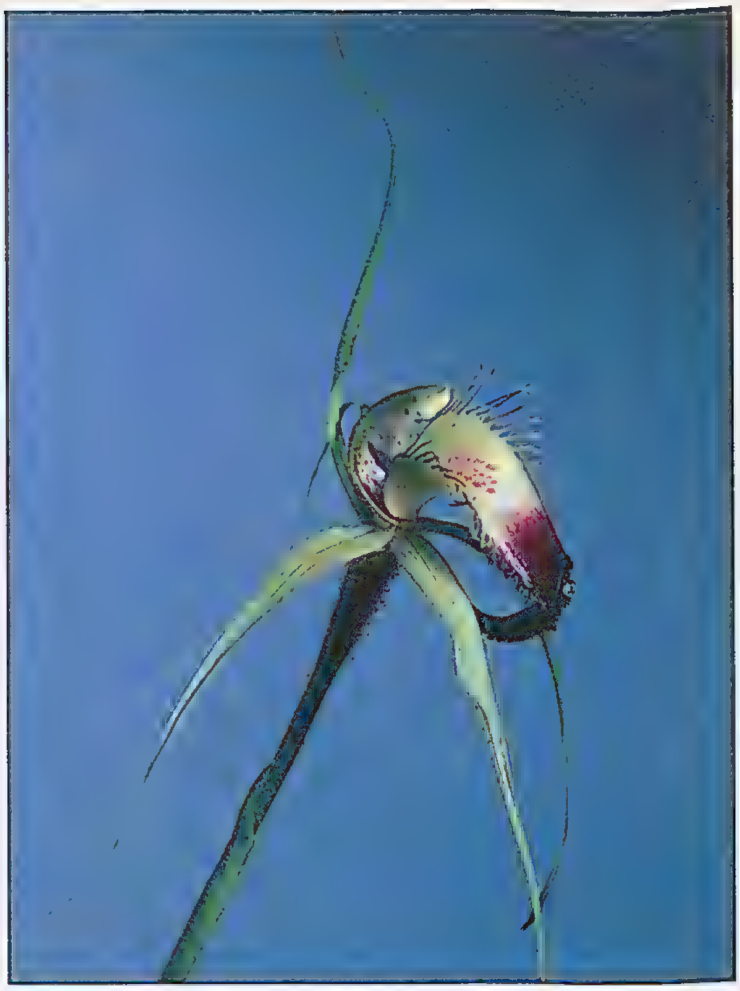
M.A. Clements

Arachnorchis tentaculata
from Mt. Gawler, South Australia



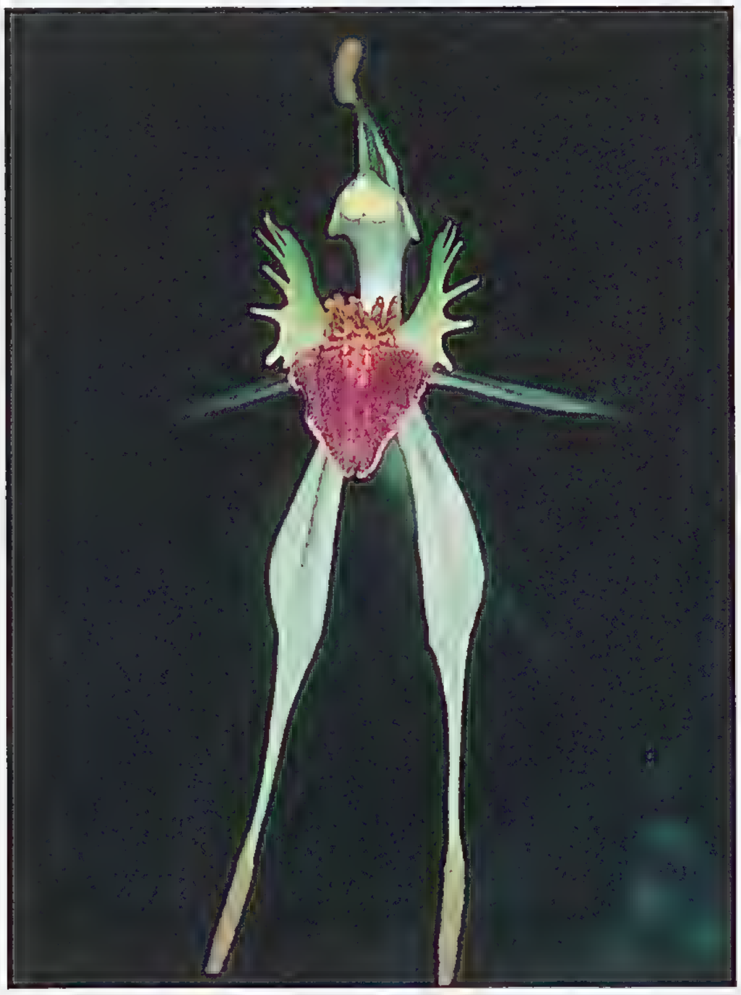
M.A. Clements

Arachnorchis ensata
from Margaret River, Western Australia



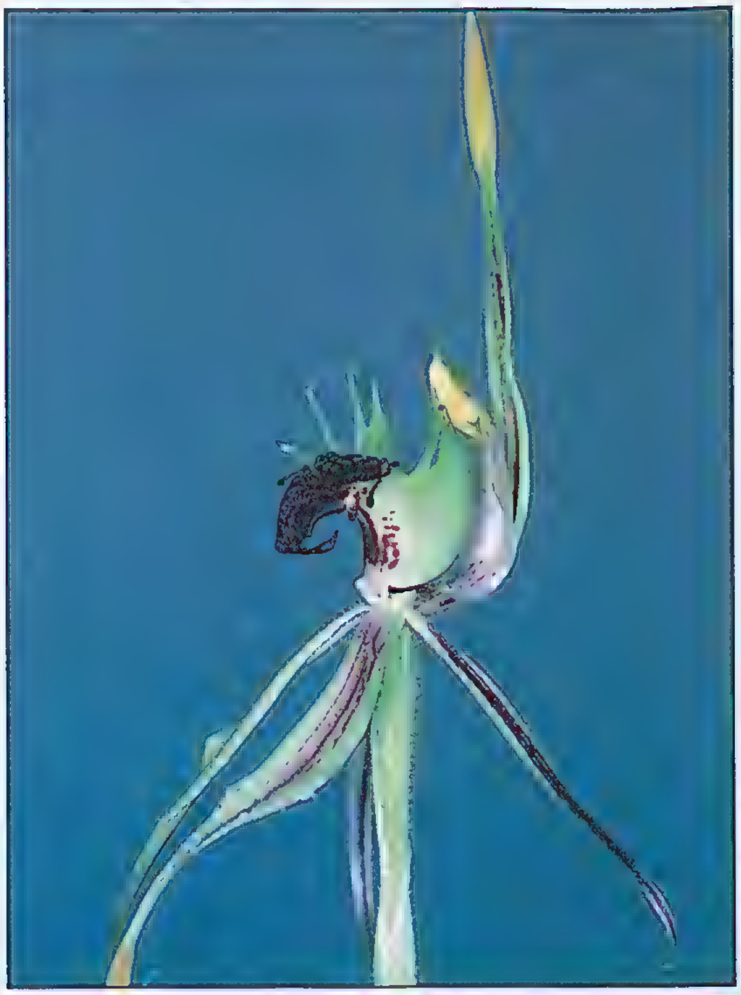
M.A. Clements

Arachnorchis infundibularis
from Augusta, Western Australia



D.P. Banks

Arachnorchis septuosa
from Eyre Peninsular, South Australia



M.A. Clements

Arachnorchis verrucosa
from Sunset National Park, Victoria

Arachnorchis subtilis (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia subtilis* D.L.Jones, *Orchadian* 13(1): 21-24, f.8, t. (1999).

Arachnorchis tensa (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia tensa* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 15 (1991).

Arachnorchis tentaculata (Schldl.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia tentaculata* Schldl., *Linnaea* 20: 571 (1847).

Arachnorchis tessellata (Fitzg.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia tessellata* Fitzg., *Austral. orch.* 1(2): [t. 3] (1876).

Arachnorchis thysanochila (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia thysanochila* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 16-17 (1991).

Arachnorchis toxochila (Tate) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia toxochila* Tate, *Trans. & Proc. Roy. Soc. South Australia* 12: 129-130 (1889).

Arachnorchis uliginosa (A.S.George) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia uliginosa* A.S.George, *Nuytsia* 5(1): 56-7, t. 2 (1984).

Arachnorchis valida (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia valida* (Nicholls) M.A.Clem.et D.L.Jones, *Austral. Orch. Res.* 1: 31 (1989).

Arachnorchis venusta (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia venusta* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 17-18 (1991).

Arachnorchis verrucosa (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia verrucosa* G.W.Carr, *Indig. Fl. & Fauna Assoc. Misc. Paper* 1: 18-19 (1991).

Arachnorchis versicolor (G.W.Carr) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia versicolor* G.W.Carr, Indig. *Fl. & Fauna Assoc. Misc. Paper* 1: 19-20 (1991).

Arachnorchis villosissima (G.W.Carr) D.L.Jones et M.A.Clem., *comb. et stat. nov.*
Basionym: *Caladenia dilatata* R.Br. *var. villosissima* G.W.Carr, Indig. *Fl. & Fauna Assoc. Misc. Paper* 1: 3 (1991).

Arachnorchis woolcockiorum (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia woolcockiorum* D.L.Jones, *Austral. Orch. Res.* 2: 35-36, f.42 (1991).

Arachnorchis xanthochila (D.Beardsell et C.Beardsell) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia xanthochila* D.Beardsell et C.Beardsell, *Aust. Syst. Bot.* 5: 513-519 (1992).

3. *Calonema* (Lindl.) D.L.Jones et M.A.Clem., *gen. et stat. nov.*

Basionym: *Caladenia* section *Calonema* Lindl. in *Edwards's Bot. Reg.* 1-23: *Swan Riv. Append.* lii (1840).
Type species: *Caladenia filifera* Lindl., *fide* Jones (2001).

Calonema (Lindl.) D.L.Szlachetko, *Polish Bot. J.* 46(1): 15 (2001), *nom. illeg.* Type species: not indicated.

Jonesiopsis D.L.Szlachetko, *Polish Bot. J.* 46(1): 14 (2001), *nom. illeg.*

Phlebochilus (Lindl.) D.L.Szlachetko, *Polish Bot. J.* 46(1): 14 (2001), *pro parte, nom. illeg.*

Etymology

Derived from the Greek *calos*, beautiful and *nema*, a thread, in reference to the thread-like segments on the tepals of some species.

Recognition

Distinguished morphologically from *Caladenia* by the presence on the leaf and scape of multiseriate, eglandular trichomes; larger flowers; and, tepaline caudae extending as tapered extensions or long filamentous structures with protruding, elongate, cylindrical (sausage-like) osmophore cells. It differs from *Arachnorchis* by the tepaline caudae, the very different osmophore cells, shiny, smooth labellum calli and the absence of basal column glands.

Typification

When elevating *Caladenia* section *Calonema* to subgeneric rank, Hopper and Brown (2000) erred by citing Bentham (1873) as the originator of this taxon, when in fact it was Lindley (1840a) who first described it. Their choice of *Caladenia patersonii* as the type for the taxon, was also in error, since this species was not listed by Lindley. However, Jones (2001) recitified the situation by designating *Caladenia filifera* Lindl. as the type and citing Lindley (1840a) as the source. *Caladenia filifera* was selected as the type, from the five listed species in the taxon, because it most closely matched the protologue, and it was the first species listed.

Szlachetko (2001), in attempting to elevate *Caladenia* sect. *Calonema* to generic status, erred firstly by citing the basionym as "*Caladenia # Calonema* [rankless subdivision] in Edward's, Bot. Reg. 1-23: Swan Riv. App. 52. 1840." which is incorrect as Lindley clearly states, in the text at the top of the page, that these taxa are sections - " ...., the glands on the species of the section *Calonema*239 ...". More importantly Szlachetko erred by not citing a type for the genus. Non citation of a type for a new genus invalidates the proposal for a new genus and all subsequent combinations made within that proposed genus (Article 37.1, ICBN).

The proposal by Szlachetko (2001) to elevate the *Caladenia* section *Phlebochilus* to generic status is similarly flawed, as he again failed to cite a type and none was cited earlier by Bentham (1873) when he first described the taxon. Since Szlachetko did not directly refer to the accounts of this taxon by either Hopper and Brown (2000) or Jones (2001), both identifying *Caladenia cairnsiana* F.Muell. as the type, their choice is not relevant to his validation of the proposed genus *Phlebochilus*.

New Combinations and Species:

Calonema bicalliatum (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia bicalliata* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 33: 17 (1909).

Calonema caesareum (Domin) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia filamentosa* R.Br. var. *caesarea* Domin, *J. Proc. Linn. Soc., Bot.* 41: 251 (1912); *Caladenia caesarea* (Domin) M.A.Clem. et Hopper, *Austral. Orch. Res.* 1: 21 (1989).

Calonema cairnsianum (F.Muell.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia cairnsiana* F.Muell., *Fragm.* 7: 31 (1869).

Calonema capillatum (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia capillata* D.L.Jones, *Orchadian* 13(6): 255-256 (2000).

Calonema cristatum (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia cristata* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 47: 337 (1923).

Calonema denticulatum (Lindl.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia denticulata* Lindl. in *Edwards's, Bot. Reg.* 1-23: *Swan Riv. Append.* lii (1840).

Calonema dorrienii (Domin) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia dorrienii* Domin, *J. Proc. Linn. Soc., Bot.* 41: 251, t. 12, f. 23 (1912).

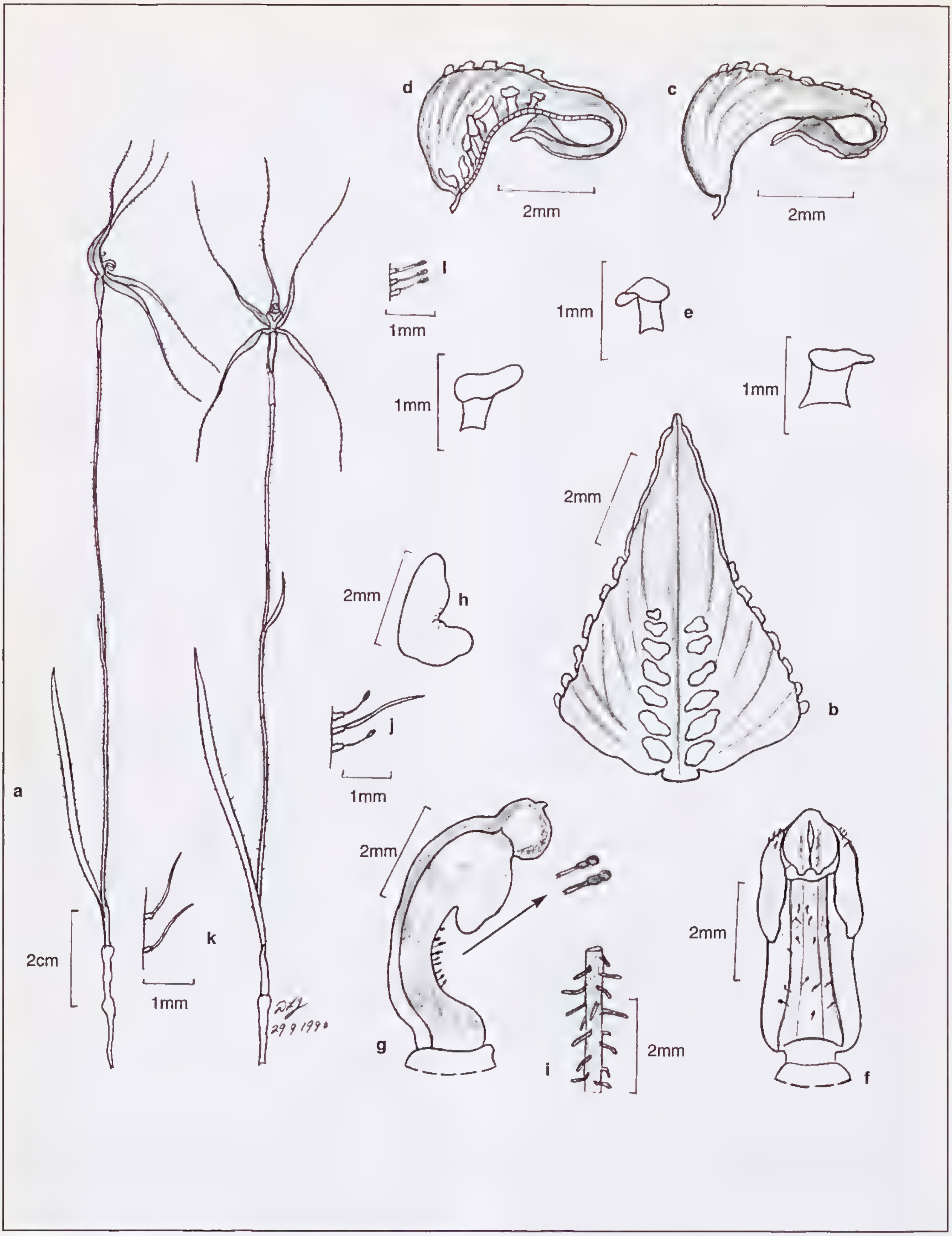
Calonema doutchiae (O.Sarg.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia doutchiae* O.Sarg., *J. Bot.* 59: 175 (1921).

Calonema filamentosum (R.Br.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia filamentosa* R.Br., *Prod.* 324 (1810).

Calonema filiferum (Lindl.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia filifera* Lindl. in *Edwards's, Bot. Reg.* 1-23: *Swan Riv. Append.* lii (1840).

Calonema flaccidum (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia flaccida* D.L.Jones, *Austral. Orch. Res.* 2: 24-25, f.27 (1991).

Calonema multiclavium (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia multiclavia* Rchbf., *Beitr. Syst. Pflanzenk.* 64 (1871).



Calonema sanguineum, **Kangaroo Island – South Australia.**

(*N. Ridley*)

a. plants; **b**. labellum from above, flattened out; **c**. labellum from side; **d**. longitudinal section of labellum; **e**. lamina calli; **f**. column from front; **g**. column from side; **h**. pollinium; **i**. section of sepaline cauda; **j**. stem trichomes; **k**. leaf trichomes; **l**. ovary trichomes.

Drawing 29/9/1990 by D.L. Jones. ©

Calonema radialis (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia radialis* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 51: 296 (1927).

Calonema roei (Benth.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia roei* Benth., *Fl. Austral.* 6: 383 (1873).

Calonema sanguineum (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia sanguinea* D.L.Jones, *Orchadian* 13(1): 17-21, f.7, t. (1999).

Calonema sigmoideum (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia sigmoidea* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 62: 12 (1938).

Calonema wanosa (A.S.George) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia wanosa* A.S.George, *Nuytsia* 5(1): 57-8, t. 3, A-E (1984).

4. *Cyanicula* Hopper et A.P.Br., *Lindleyana* 15(2): 120 (2000).
Type species: *Cyanicula gemmata* (Lindl.) Hopper et A.P.Br.
Pentisea (Lindl.) D.L.Szlachetko, *Polish Bot. J.* 46(1): 19 (2001);
Caladenia R.Br. sect. *Pentisea* Lindl. in Edwards's, *Bot. Reg.* 1-23: *Swan Riv. Append.* liii (1840). Type: *Caladenia gemmata* Lindl.

Etymology

Derived from the Greek *cyanos*, blue and the diminutive suffix *–icula*, in reference to small blue flowers.

Recognition

Distinguished morphologically from *Caladenia* R.Br., by the presence on the leaf and scape of multiseriate eglandular trichomes ornamented with micropapillae and without an enlarged basal cell; blue [rarely white or yellow] flowers with multiseriate [darlec-like] glands on the exterior surface of the sepals and petals; and, linear or obovoid-clavate, smooth or micropapillate labellum calli loosely arranged in many rows.

Distribution

A genus of 9 species, 8 in Western Australia and one in eastern Australia.

Species

Cyanicula amplexans (A.S.George) Hopper et A.P.Br., *Lindleyana* 15(2): 120 (2000).

Cyanicula ashbyae Hopper et A.P.Br., *Lindleyana* 15(2): 120-121 (2000).

Cyanicula caerulea (R.Br.) Hopper et A.P.Br., *Lindleyana* 15(2): 121 (2000).

Cyanicula fragrans Hopper et A.P.Br., *Lindleyana* 15(2): 121-123 (2000).

Cyanicula gemmata (Lindl.) Hopper et A.P.Br., *Lindleyana* 15(2): 123 (2000).

Cyanicula gertrudiae (Ostenf.) Hopper et A.P.Br., *Lindleyana* 15(2): 123 (2000).

Cyanicula ixioides (Lindl.) Hopper et A.P.Br., *Lindleyana* 15(2): 123 (2000).

Cyanicula nikulinskyae Hopper et A.P.Br., *Lindleyana* 15(2): 123-124 (2000).

Cyanicula sericea (Lindl.) Hopper et A.P.Br., *Lindleyana* 15(2): 124 (2000).

5. *Drakonorchis* (Hopper et A.P.Br.) D.L.Jones et M.A.Clem., ***gen. et stat. nov.***
Basionym: *Caladenia* subgenus *Drakonorchis* Hopper & A.P.Br., *Lindleyana* 15(2): 124 (2000).
Type species: *Caladenia barbarossa* Rchb.f.

Etymology

Derived from the Greek *drakon*, dragon and *orchis*, orchid, in reference to the vernacular commonly applied to these orchids.

Recognition

Distinguished from *Caladenia, Arachnorchis* and *Calonema* by the tightly hinged labellum, rigid fleshy labellum base with two ligulate lateral appendages, thin recurved labellum lamina adorned with hairs and shiny glandular areas and a greatly enlarged, shiny basal callus on the labellum lamina.

Distribution

A genus of four species endemic in Western Australia.

New combination:
Drakonorchis barbarossa (Rchb.f.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia barbarossa* Rchb.f., *Beitr. Syst. Pflanzenk.* 64 (1871).

6. *Elythranthera* (Endl.) A.S.George, *West Australian Naturalist* 9: 6 (1963).
Type species: *Glossodia brunonis* Endl. (*Elythranthera brunonis* (Endl.) A.S.George).

Etymology

Derived from the greek *elytron* sheath, and the Latin *anthera*, anther, in reference to the column wings covering the anther.

Recognition

Recognised by terete, multiseriate, glandular trichomes on the leaf and scape; exterior surface of the perianth segments prominently blotched; interior surface of perianth segments strongly glossy; and, labellum unlobed, reduced to a linear or ligulate unadorned lamina with two separate, elongate, prostrate, fleshy basal calli.

Distribution

Two species and a named natural hybrid, all endemic in Western Australia.

Species

Elythranthera brunonis (Endl.) A.S.George, *West Australian Naturalist* 9: 6 (1963).

Elythranthera emarginata (Lindl.) A.S.George, *West Australian Naturalist* 9: 7 (1963).

Elythranthera X intermedia (Fitzg.) M.A.Clem., *Austral. Orch. Res.* 1: 73 (1989).

7. *Glossodia* R.Br., *Prod.* 325 (1810).
Type species: *Glossodia major* R.Br.

Etymology

From the Greek, *glossa*, tongue and *–odes*, likeness, apparently in reference to the tongue-like calli at the labellum base.

Recognition

Recognised by terete, multiseriate, glandular trichomes on the leaf and scape; exterior surface of the perianth segments uniformly coloured; interior surface of perianth segments dull to shiny but never glossy; and, labellum large, obscurely 3-lobed, the lamina papillate, with two erect, hard basal calli fused throughout or at least united at the base.

Distribution

Two species endemic in eastern Australia.

Species

Glossodia major R.Br., *Prod.* 326 (1810).

Glossodia minor R.Br., *Prod.* 326 (1810).

8. *Glycorchis* D.L.Jones et M.A.Clem., **gen. nov**. Affinis *Cyanicula* Hopper et A.P.Br., sed floribus albis; trichomibus foliorum et caulium cellulis basalibus turgidus; glandulis sessilibus exterior sepalorum uniseriatis; et callis labelli capitulis turgidis, papillatis, differt.

Etymology

Derived from the Greek *glycos,* sweet and *Orchis,* another genus of Orchidaceae but also used generally for any orchid. Sugar orchid is the vernacular commonly applied to this species.

Recognition

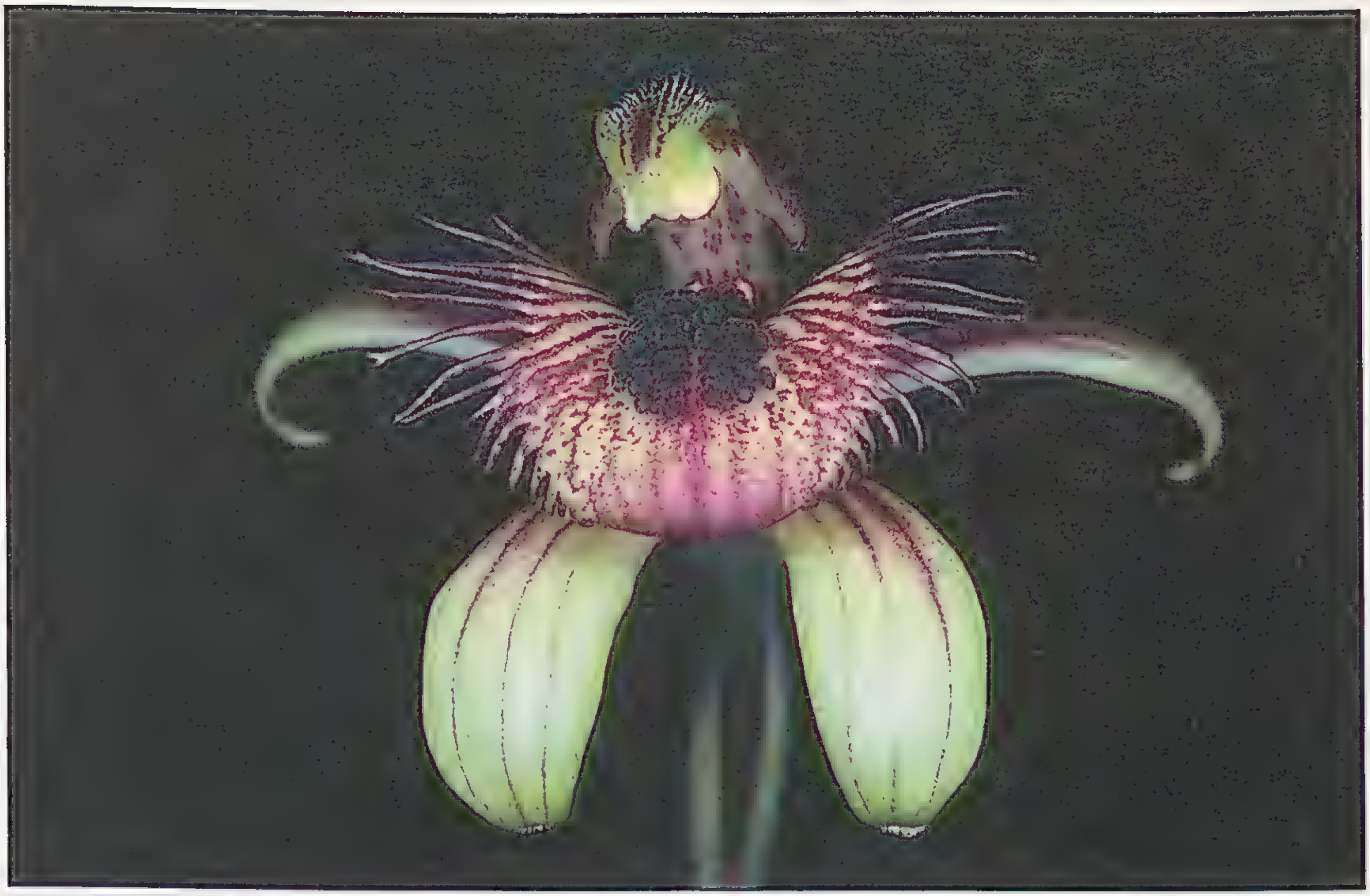
Distinguished morphologically from *Cyanicula* Hopper et A.P.Br., by the presence on the leaf and scape of multiseriate, glandular and eglandular trichomes with an enlarged basal cell; white flowers with uniseriate, sessile glands on the exterior surface of the sepals and petals; and, labellum calli arranged in two rows and with enlarged, papillate heads. The scapes are also single-flowered.

New combination:
Glycorchis saccharata (Rchb.f.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia saccharata* Rchb.f., *Beitr. Syst. Pflanzenk.* 63 (1871).

9. *Leptoceras* (R.Br.) Lindl., in *Edwards's, Bot. Reg.* 1-23: *Swan Riv. Append.* liii (1840).
Type species: *Leptoceras menziesii* (R.Br.) Lindl.

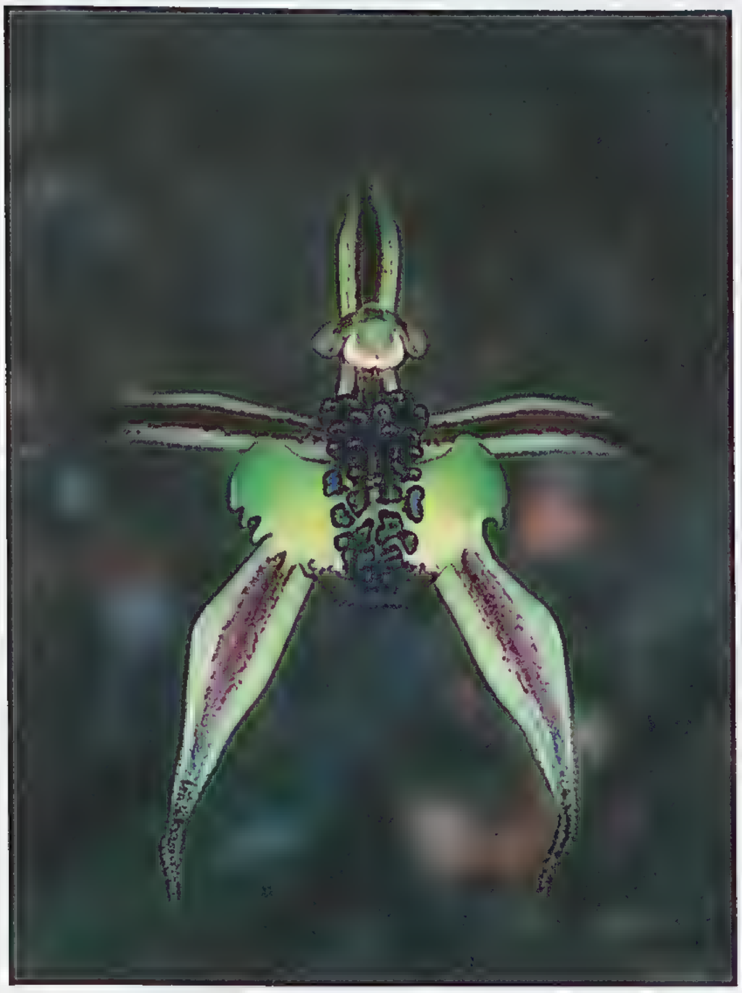
Etymology

Derived from the Greek *leptos,* slender and *ceras,* horn, in reference to the narrow, erect horn-like petals.



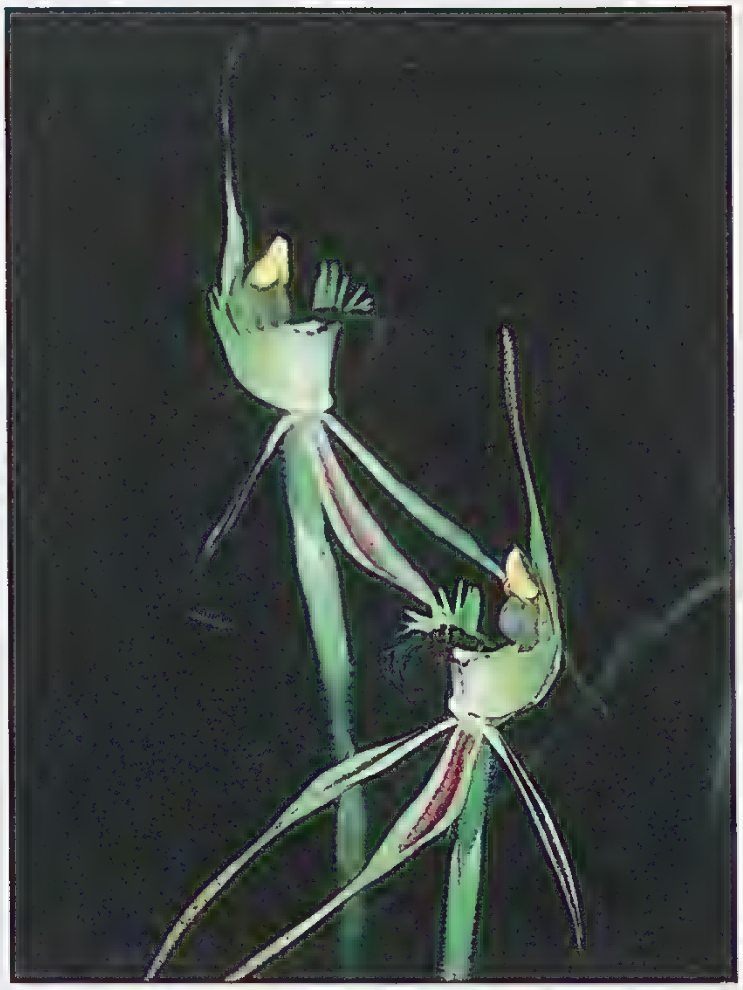
D.P. Banks

Arachnorchis discoidea
from near Bunbury, Western Australia



D.P. Banks

Arachnorchis conferta
from Mulaura Flora Res., South Australia



D.P. Banks

Arachnorchis parva
from Glenelg River, South Australia

Recognition

Recognised by the habit of growing in clonal colonies arising from the production of daughter tubers on the end of stolonoid roots; glabrous leaf; sterile leaf with a basal ligule-like growth; and, the erect, linear-clavate ear-like or horn-like petals densely covered with sessile, hemispherical glands.

Distribution

A monotypic genus endemic in southern Australia.

Species

Leptoceras menziesii (R.Br.) Lindl., in *Edwards's, Bot. Reg.* 1-23: *Swan Riv. Append.* liii (1840).

10. *Petalochilus* R.S.Rogers, *J. Bot.* 62: 65 (1924).

Type species: *Petalochilus calyciformis* R.S.Rogers, here designated.

Etymology

Derived from the Greek, *petalon*, leaf, petal and *cheilos*, lip; in reference to the peloric undeveloped petal-like labellum of the two species on which the genus was originally based.

Recognition

Distinguished morphologically from *Caladenia* by the labellum calli being separate from each other (not on a plate-like structure) and usually arranged in two rows. The heads of individual calli are enlarged and the basal calli larger than and usually of a different colour to the other labellum calli. In these orchids the labellum and column are usually ornamented with prominent red transverse bars.

Distribution

A genus of about 40 species occurring in Australia, New Zealand, New Caledonia and parts of Indonesia.

New Combinations and Species

Petalochilus alatus (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia alata* R.Br., *Prod.* 324 (1810).

Petalochilus atrochilus (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia atrochila* D.L.Jones, *Austral. Orch. Res.* 3: 23-24, f. 2.3 (1999).

Petalochilus attenuatus (W.Brinsley) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia carnea* R.Br. var. *attenuata* W.Brinsley, *Orchadian* 3(2): 16, f. (1968); *Caladenia attenuata* (W.Brinsley) D.L.Jones, *Orchadian* 13(6): 256-257 (2000).

Petalochilus aurantiacus (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia carnea* R.Br. var. *aurantiaca* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 46: 154 (1922); *Caladenia aurantiaca* (R.S.Rogers) Rupp, *Proc. Linn. Soc. New South Wales* 71: 280 (1947).

Petalochilus bartlettii (Hatch) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia carnea* R.Br. var. *bartlettii* Hatch, *Trans. Roy. Soc. New Zealand* 77: 402 (1949); *Caladenia bartlettii* (Hatch) D.L. Jones, Molloy et M.A.Clem., *Orchadian* 12(5): 227-228 (1997).

Petalochilus calyciformis R.S.Rogers, *J. Bot.* 62: 65-66, t. 571, f. 1-3 (1924).

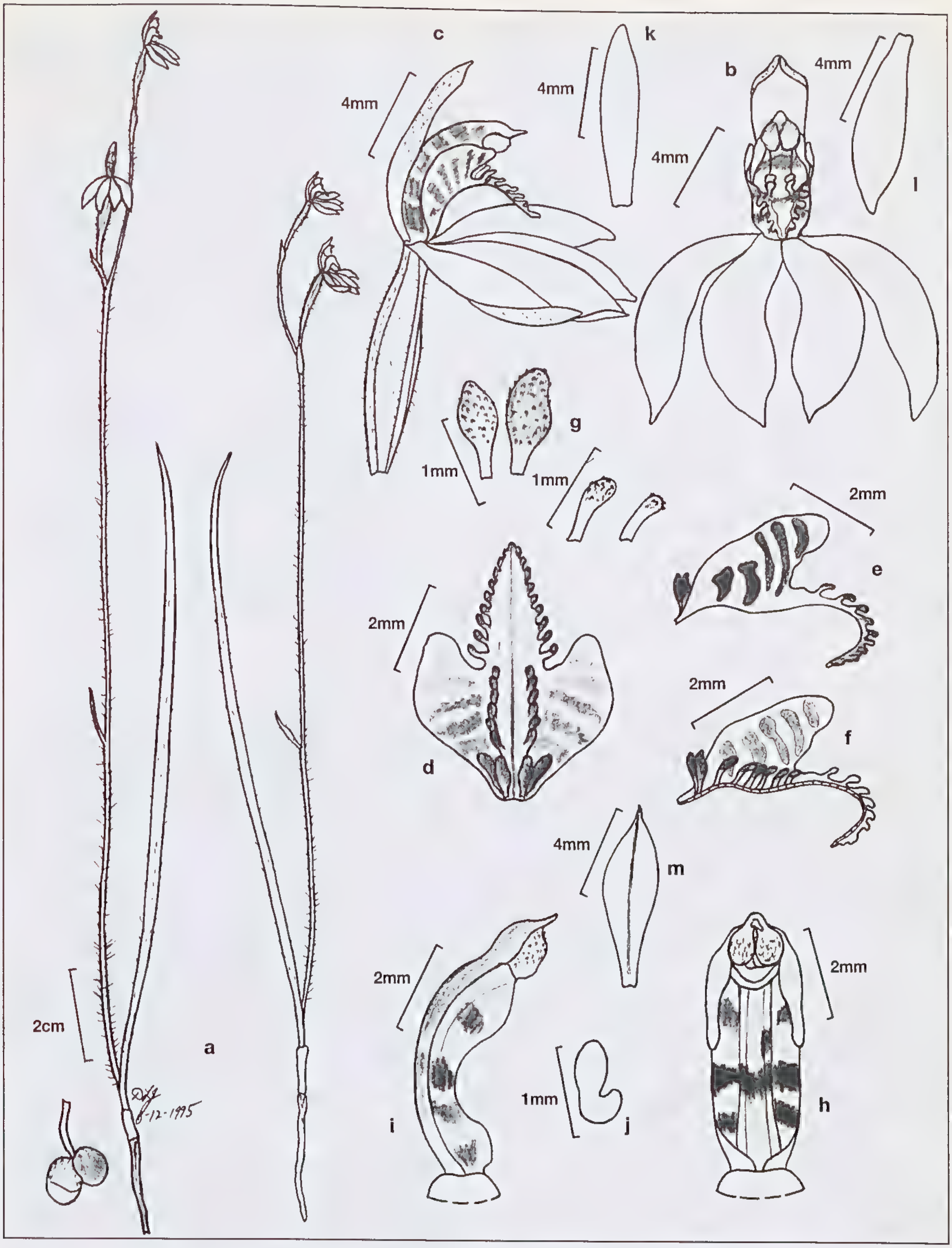
Petalochilus campbellii (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia campbellii* D.L.Jones, *Austral. Orch. Res.* 3: 25-26, f. 2.4 (1999).

Petalochilus carneus (R.Br.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia carnea* R.Br., *Prod.* 324 (1810).

Petalochilus catenatus (Sm.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Arethusa catenata* Sm., Exotic Bot. 2: 89, t. 104 (1805); *Caladenia catenata* (Sm.) Druce, *Rep. Bot. Exch. Cl. Brit. Isles, Suppl.* 2: 611 (1917).

Petalochilus chamaephyllus (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia chamaephylla* D.L.Jones, *Orchadian* 13(1): 6-7, f.2, t. (1999).

Petalochilus chlorostylus (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia chlorostyla* D.L.Jones, Molloy et M.A.Clem., *Orchadian* 12(5): 223, f.1 (1997).

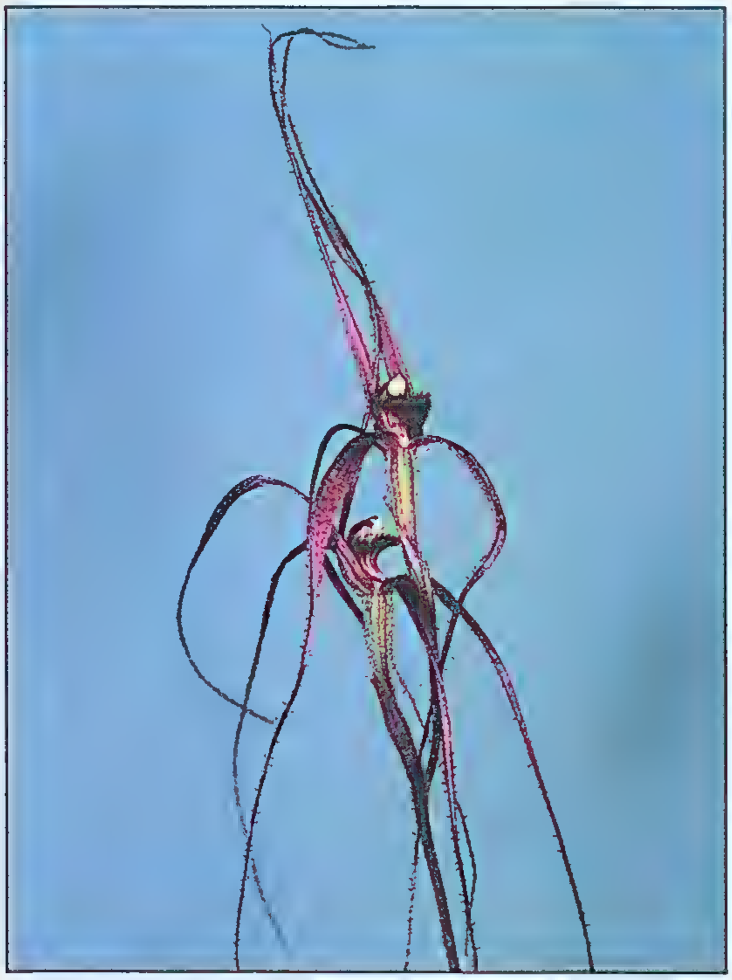


Petalochilus chlorostylus, Paranui – New Zealand.

(B.P. Molloy)

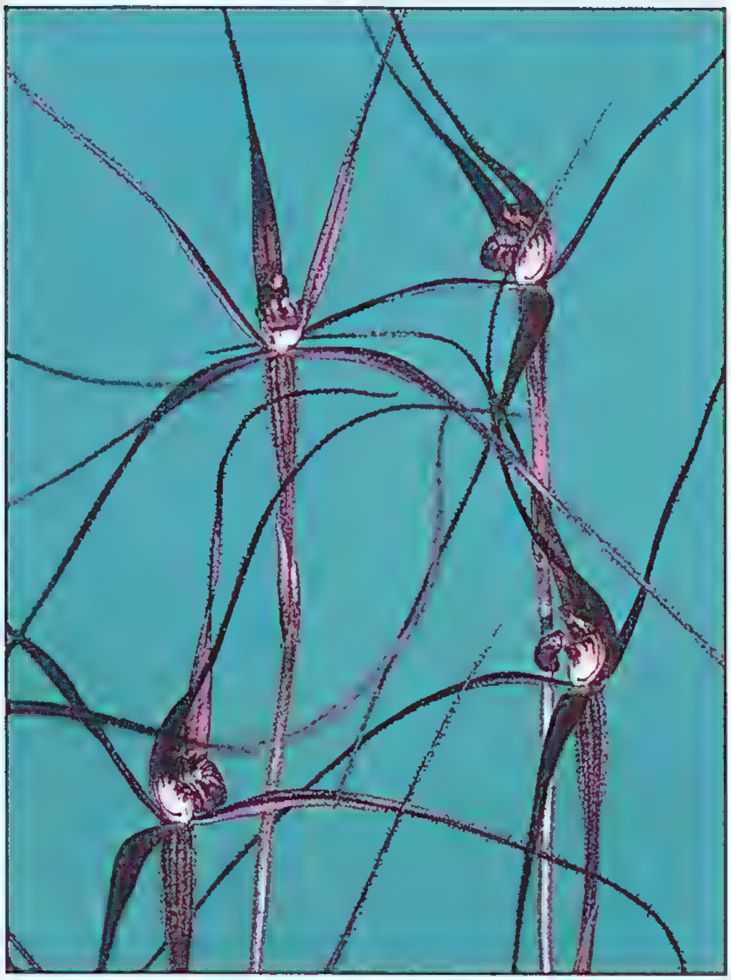
a. plants; **b**. flower from front; **c**. flower from side; **d**. labellum from above, flattened out; **e**. labellum from side; **f**. longitudinal section of labellum; **g**. lamina calli; **h**. column from front; **i**. column from side; **j**. pollinium; **k**. dorsal sepal; **l**. lateral sepal; **m**. petal.

Drawing 6/12/1995 by D.L. Jones. ©



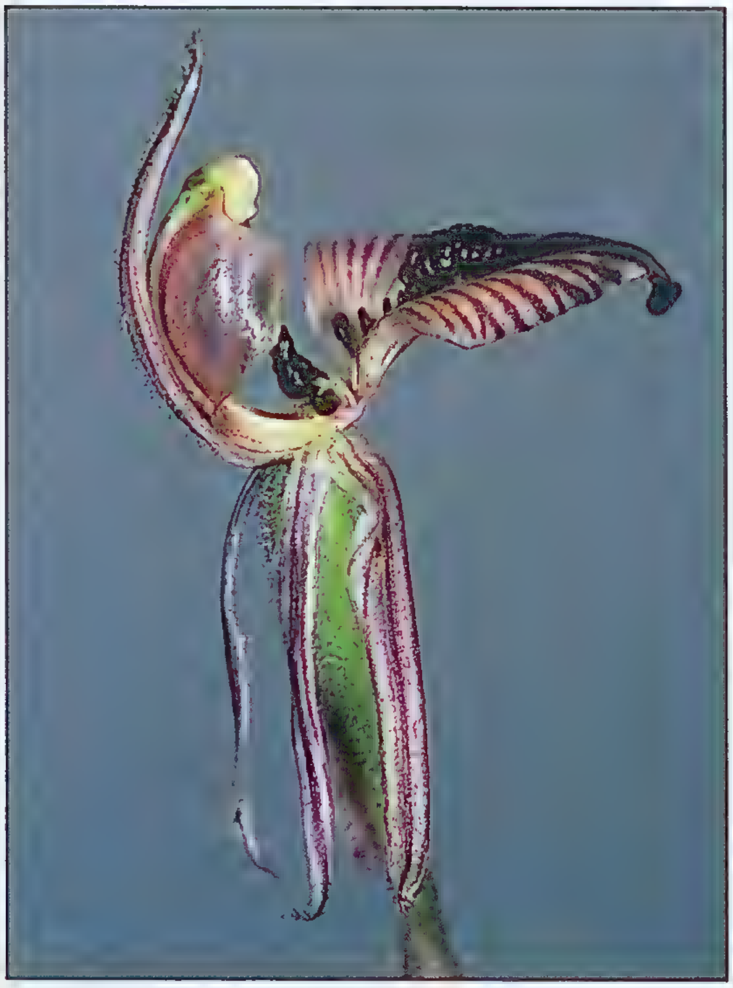
M.A. Clements

Calonema filiferum
from 10 Mile School Site, Western Australia



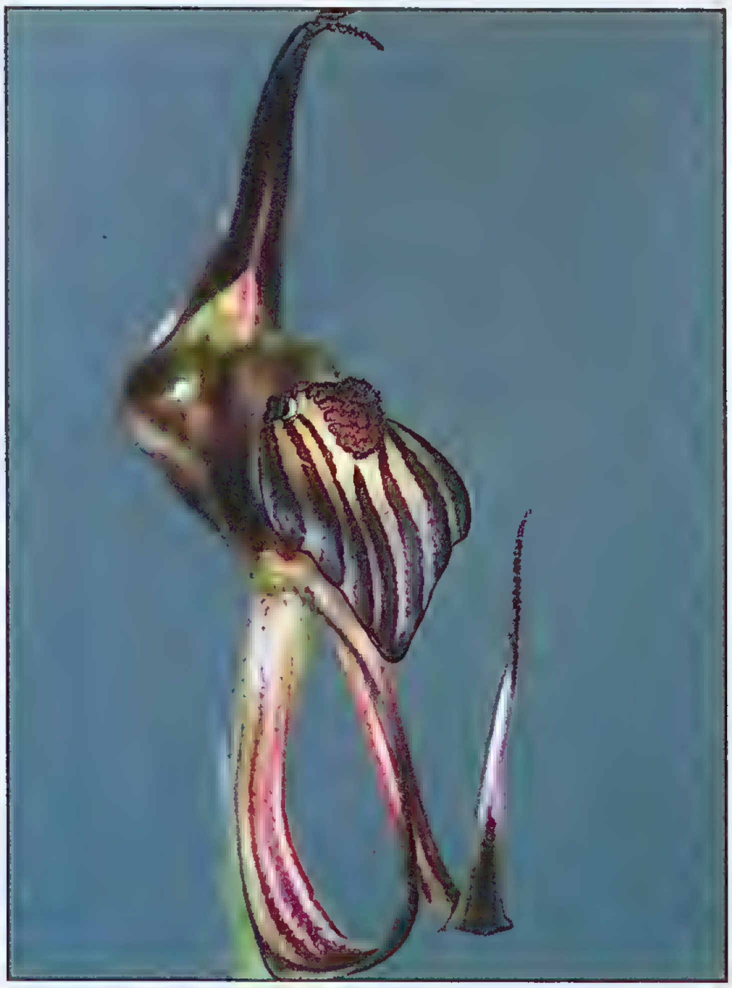
M.A. Clements

Calonema sanguineum
Seal Bay (Kangaroo Island), South Australia



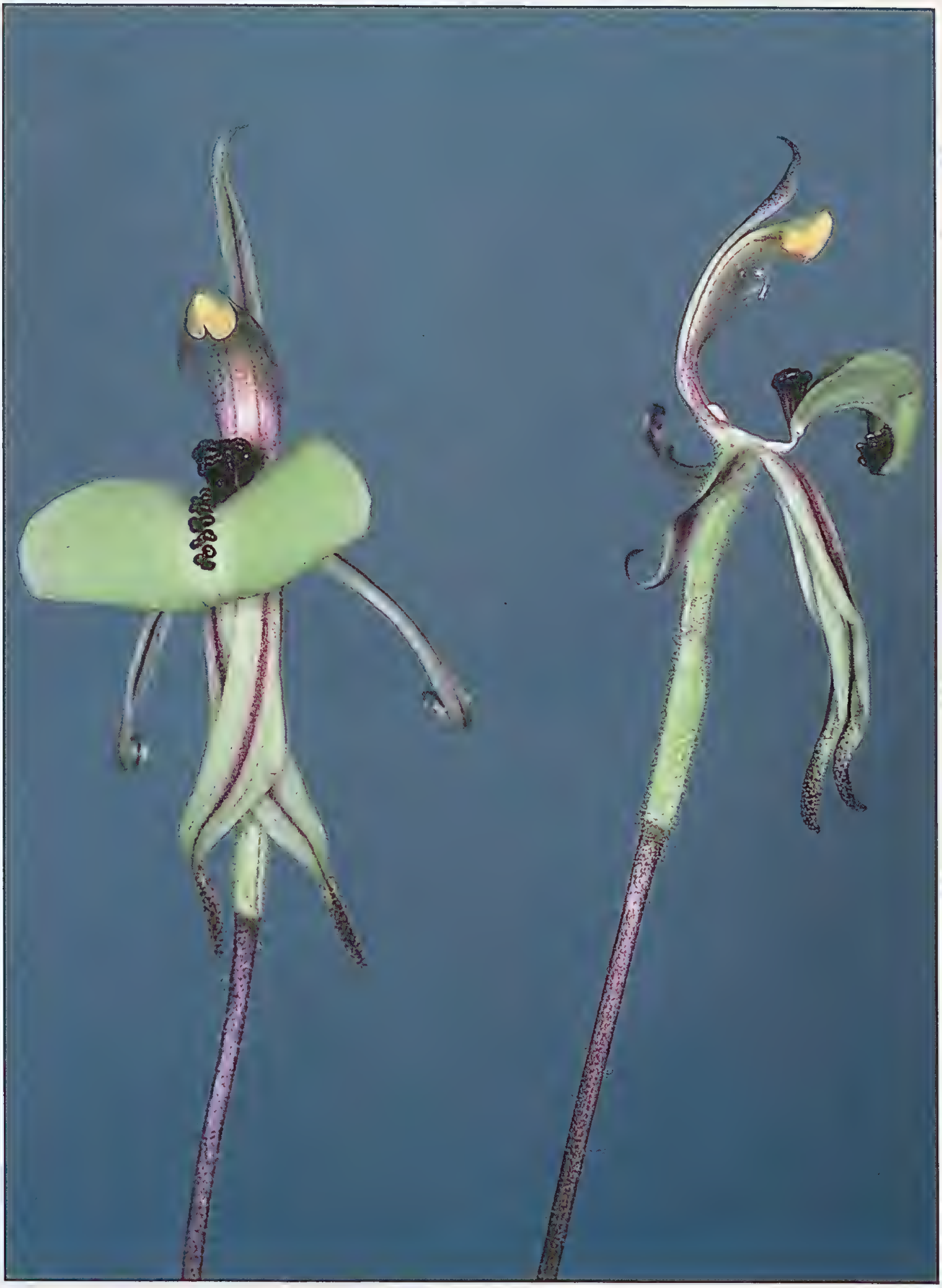
M.A. Clements

Calonema cairnsianum
from Stirling Range, Western Australia



M.A. Clements

Calonema multiclavium
from Peenebup River, Western Australia



M.A. Clements

Calonema roei

from Wyalkatchen Rd., Western Australia

Petalochilus cleistanthus (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia cleistantha* D.L.Jones, *Austral. Orch. Res.* 2: 19-20, f. 20 (1991).

Petalochilus coactilis (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia coactilis* D.L.Jones, *Austral. Orch. Res.* 2: 20, f. 21 (1991).

Petalochilus curtisepalus (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia curtisepala* D.L.Jones, *Austral. Orch. Res.* 2: 23, f. 25 (1991).

Petalochilus fuscatus (Rchb.f.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia carnea* R.Br. var. *fuscata* Rchb.f., *Beitr. Syst. Pflanzenk.* 63 (1871); *Caladenia fuscata* (Rchb.f.) M.A.Clem. et D.L.Jones, *Austral. Orch. Res.* 1: 25 (1989).

Petalochilus gracillimus (Rupp) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia carnea* R.Br. var. *gracillima* Rupp, *Queensland Naturalist* 11(4): 86-87, f. (1940); *Caladenia gracillima* (Rupp) D.L.Jones, *Orchadian* 13(6): 256 (2000).

Petalochilus hillmanii (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia hillmanii* D.L.Jones, *Muelleria* 8(2): 181-182, f. 1h-k (1994).

Petalochilus javanicus (Benn. ex Ridl.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia javanica* Benn. ex Ridl. in *H.O.Forbes, Nat. Wand. East. Archip.* 518 (1885).

Petalochilus maritimus (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia maritima* D.L.Jones, *Orchadian* 13(1): 11-15, f., (1999).

Petalochilus mentiens (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia mentiens* D.L.Jones, *Austral. Orch. Res.* 3: 35-36, f. 2.9 (1999).

Petalochilus minor (Hook.f.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia minor* Hook.f., *Fl. nov.-zel.* 1: 247 (1853).

Petalochilus nothofageti (D.L.Jones, Molloy et M.A.Clem.)D.L.Jones et M.A.Clem.,*comb. nov.*
Basionym: *Caladenia nothofageti* D.L.Jones, Molloy et M.A.Clem., *Orchadian* 12(5): 223, f.1 (1997).

Petalochilus ornatus (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia carnea* R.Br. var. *ornata* Nicholls, *Victorian Naturalist* 62: 61, f. G-J (1945); *Caladenia ornata* (Nicholls) D.L.Jones, *Orchadian* 13(6): 256 (2000).

Petalochilus pictus (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia alba* R.Br. var. *picta* Nicholls, *Victorian Naturalist* 47: 157-161, f.VII a,b,c (1931); *Caladenia picta* (Nicholls) M.A.Clem. et D.L.Jones, *Austral. Orch. Res.* 1: 29 (1989)

Petalochilus porphyreus (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia porphyrea* D.L.Jones, *Orchadian* 13(1): 16-17, f.6 (1999).

Petalochilus prolatus (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia prolata* D.L.Jones, *Austral. Orch. Res.* 2: 30-31, f.35 (1991).

Petalochilus pusillus (W.M.Curtis) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia pusilla* W.M.Curtis, *Student's Fl. Tas.* pt. 4A: 133 (1980).

Petalochilus quadrifarius (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia quadrifaria* D.L.Jones, *Austral. Orch. Res.* 2: 31, f. 36 (1991).

Petalochilus saccatas R.S.Rogers, *J. Bot.* 62: 66-67, t. 572, f. 4-7 (1924).

Petalochilus sylvicola (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia sylvicola* D.L.Jones, *Austral. Orch. Res.* 3: 40-41, f. 2.12 (1999).

Petalochilus tonellii (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia tonellii* D.L.Jones, *Austral. Orch. Res.* 3: 41-42, f. 2.13 (1999).

Petalochilus variegatus (Colenso) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia variegata* Colenso, *Trans. & Proc. New Zealand Inst.* 17: 248 (1885).

Petalochilus vulgaris (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia vulgaris* D.L.Jones, *Austral. Orch. Res.* 2: 34-35, f. 41 (1991).

Petalochilus xantholeucus (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia xantholeuca* D.L.Jones, *Austral. Orch. Res.* 2: 36, f.43 (1991).

11. *Pheladenia* D.L.Jones et M.A.Clem., ***gen. nov.*** Affinis *Caladenia* R.Br., sed tuberibus admodum inclusis intra tunicam multistratosam; trichomatibus folii et scapii complanatis multicellularibus eglandularibus; callis labelli dimorphis columnibus. Etiam affinis *Cyanicula* Hopper et A.P.Br., sed trichomatibus folii complanatibus epapillatis; labello trilobatis callis dimorphis, papillis callorum basilarium longis angustisque.
Type species: *Caladenia deformis* R.Br.

Etymology
Derived from the Greek *phelos*, false, and *aden*, gland, in reference to the distinctive labellum calli.

Recognition
Recognised by the tubers being fully enclosed in a multilayered tunic, the leaf and scape bearing flattened, multicellular, egandular trichomes and with dimorphic, columnar calli. It has also been included with *Cyanicula* but has the leaf and scape bearing flattened, multicellular, egandular, non-papillate trichomes, trilobed labellum with dimorphic columnar calli, the basal labellum calli bearing long, narrow micropapillae.

Distribution
A monotypic genus endemic in southern Australia.

New Combination:
Pheladenia deformis (R.Br.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia deformis* R.Br., *Prod.* 324 (1810); *Cyanicula deformis* (R.Br.) Hopper et A.P.Br., *Lindleyana* 15(2): 121 (2000).

12. *Praecoxanthus* Hopper et A.P.Br., *Lindleyana* 15(2): 124 (2000).
Type species: *Praecoxanthus aphyllus* (Benth.) Hopper et A.P.Br.

Etymology
Derived from the Latin *praecox*, precocious, developing early and *anthus*, flower, in reference to its autumnal flowering habit.

Recognition
Recognised by the autumnal flowering habit, the inflorescences being leafless and the sterile plants with a glabrous, variegated leaf. The scapes are also single-flowered.

Distribution
A monotypic genus endemic in Western Australia.

Species
Praecoxanthus aphyllus (Benth.) Hopper et A.P.Br., *Lindleyana* 15(2): 124 (2000).

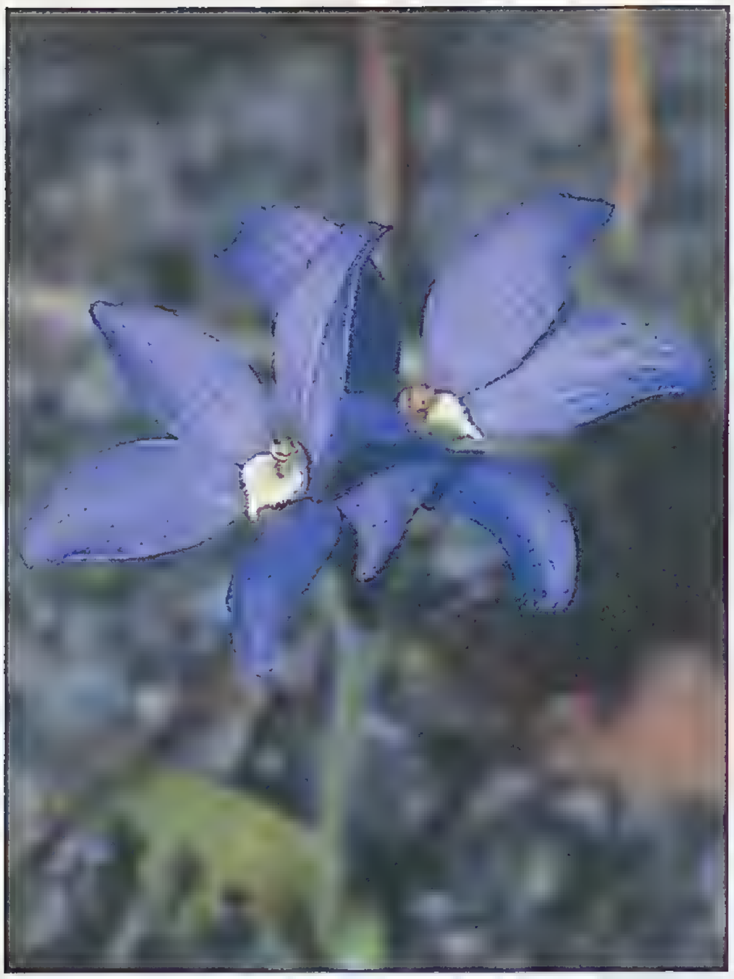
13. *Stegostyla* D.L.Jones et M.A.Clem., ***gen. nov.*** Affinis *Caladeniae* R.Br. sed sepalo dorsali valde cucullato, columna circumdante; callis labelli discretis, in 4 serebus, capitulis calli amplificatis, valde papillatis; et denticulis marginalis labelli papillatis, differt.
Type species: *Caladenia gracilis* R.Br.

Etymology
Derived from the Greek *stego*, cover, roof and *stylos*, column, pillar, in reference to the strongly incurved, cap-like dorsal sepal which covers the column.

Recognition
Distinguished morphologically from *Caladenia* by the cap-like dorsal sepal which is strongly inarched over the column and the labellum calli being separate from each other (not on a plate-like structure) and usually arranged in four rows. The heads of individual calli are enlarged, strongly papillate; and, the marginal teeth of the labellum are short and papillate. In these orchids the external surfaces of the sepals and petals are usually heavily adorned with sessile glands.

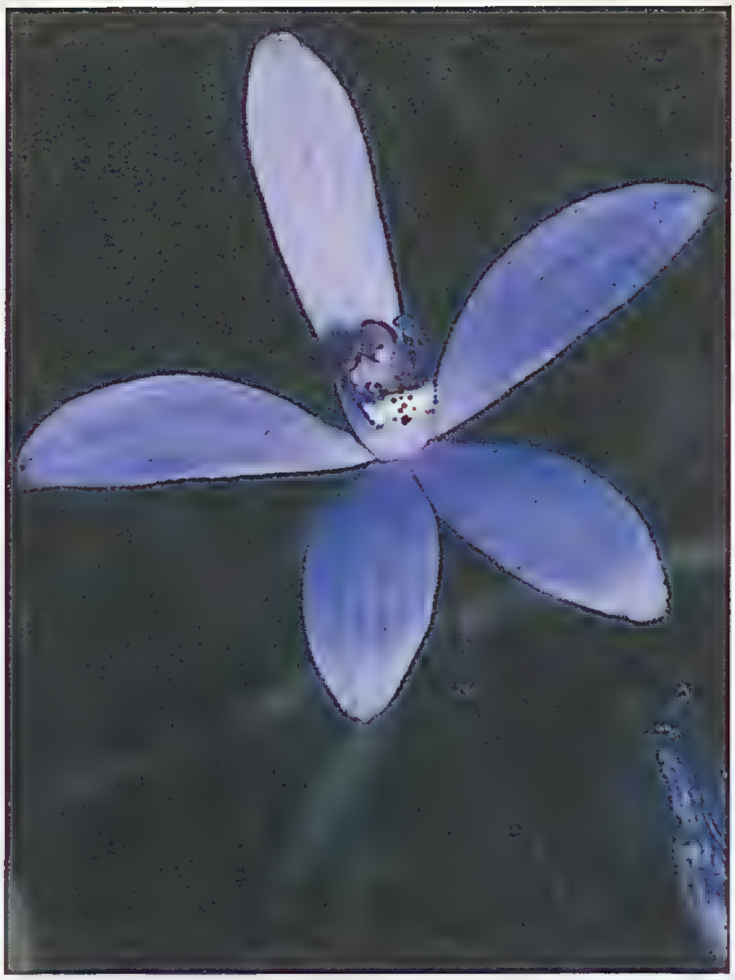
Distribution
A genus of about 20 species occurring in Australia and New Zealand.

New combinations:
Stegostyla alpina (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia alpina* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 51: 12 (1927).



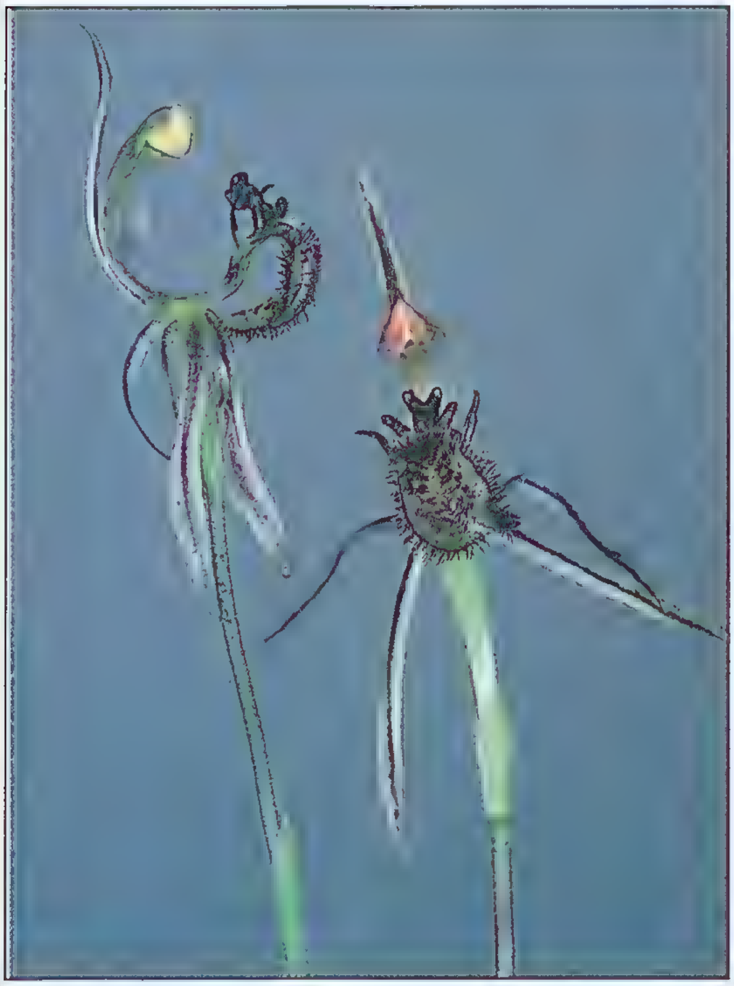
M.A. Clements

Cyanicula gemmata
from Manjimup, Western Australia



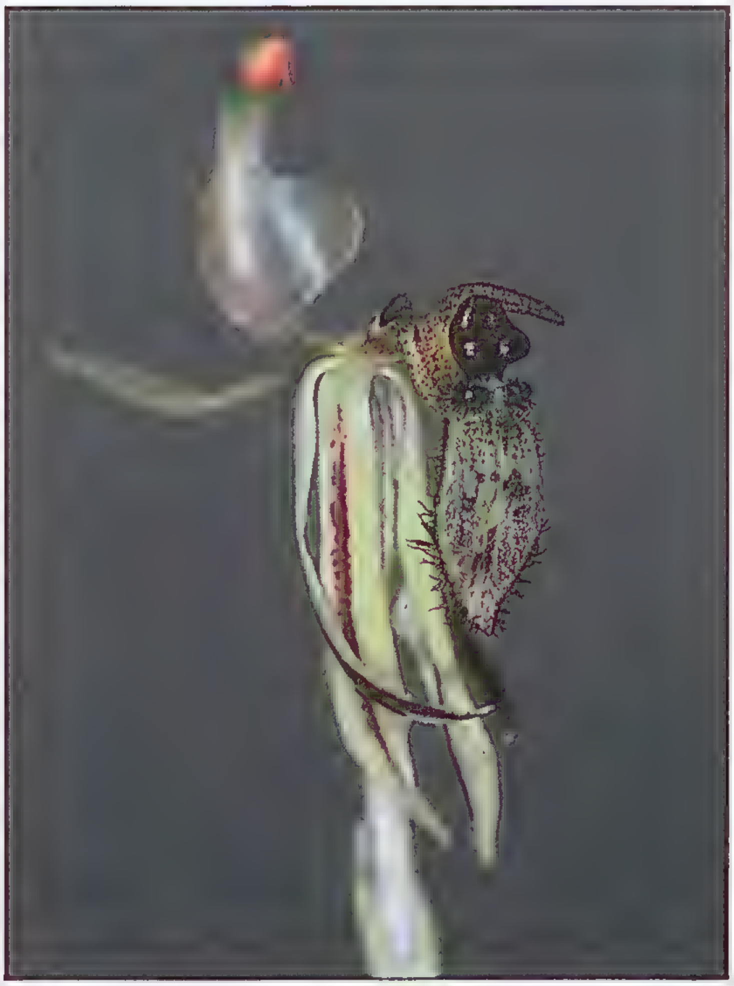
M.A. Clements

Cyanicula sericea
from Manjimup, Western Australia



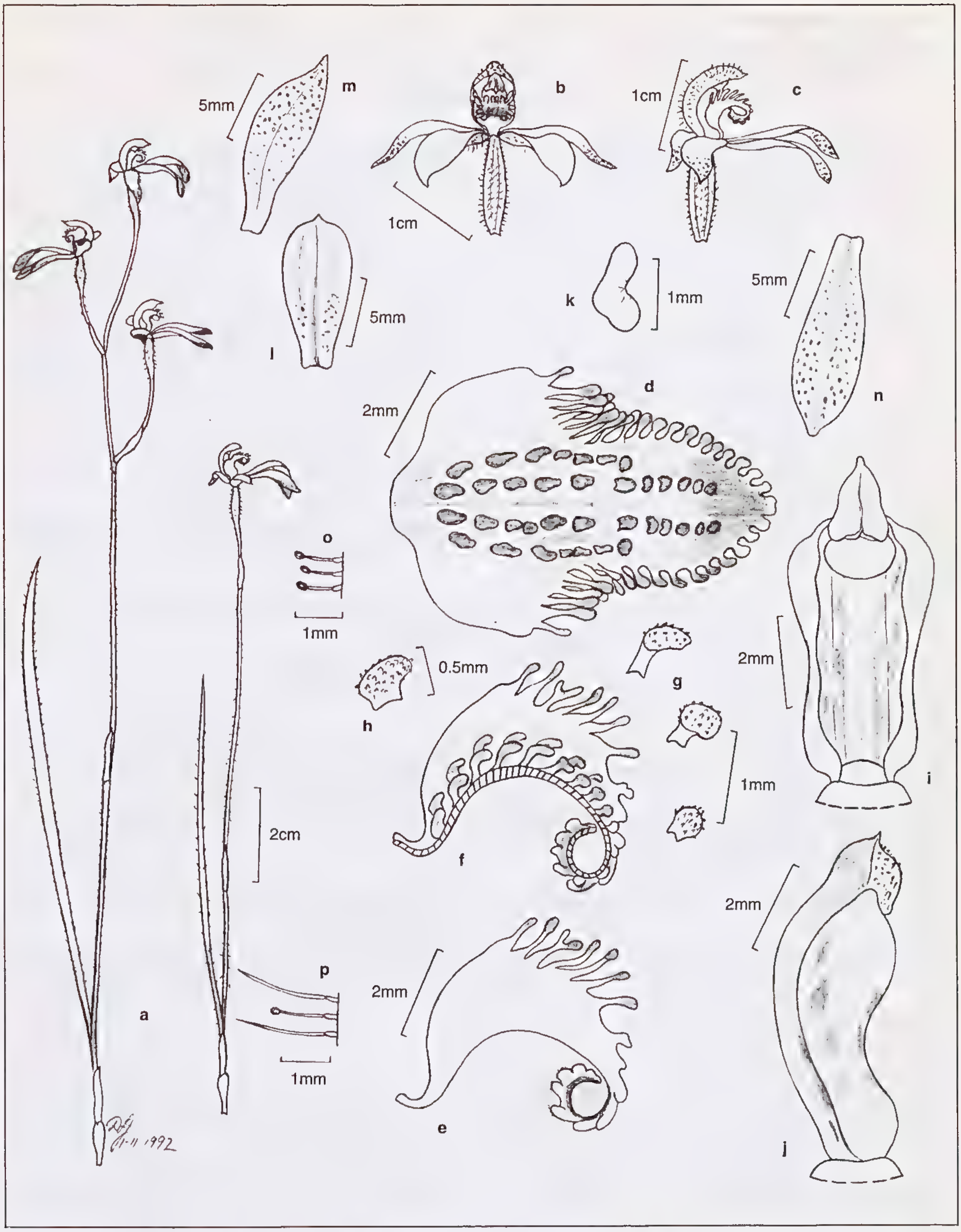
M.A. Clements

Drakonorchis barbarossa
from near Perth, Western Australia



M.A. Clements

Drakonorchis mesocera
from near Latham, Western Australia



Stegostyla **sp. aff.** ***dimorpha,*** **Black Mountain – ACT.**

(*D.L. Jones*)

a. plants; **b**. flower from front; **c**. flower from side; **d**. labellum from above, flattened out; **e**. labellum from side; **f**. longitudinal section of labellum; **g**.& **h**. lamina calli; **i**. column from front; **j**. column from side; **k**. pollinium; **l**. dorsal sepal; **m**. lateral sepal; **n**. petal; **o**. ovary trichomes; **p**. stem and leaf trichomes.

Drawing 1/11/1992 by D.L. Jones. ©

Stegostyla angustata (Lindl.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia angustata* Lindl., *Gen. sp. orchid. pl.* 420 (1840).

Stegostyla atradenia (D.L.Jones, Molloy et M.A.Clem.)D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia atradenia* D.L.Jones, *Orchadian* 12(5): 221-222 (1997).

Stegostyla atrata (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia atrata* D.L.Jones, *Muelleria* 8(2): 178-181, f. 1a-g (1994).

Stegostyla clarkiae (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia clarkiae* D.L.Jones, *Austral. Orch. Res.* 2: 17-18, f. 18 (1991).

Stegostyla congesta (R.Br.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia congesta* R.Br., *Prod.* 324 (1810).

Stegostyla cracens (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia cracens* D.L.Jones, *Muelleria* 9: 46-48, f. 3 (1996).

Stegostyla cucullata (Fitzg.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia cucullata* Fitzg., *Austral. orch.* 1(2): [t. 4] (1876).

Stegostyla dimorpha (Fitzg.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia dimorpha* Fitzg., *Austral. orch.* 1(1): [t. 3] (1875).

Stegostyla gracilis (R.Br.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia gracilis* R.Br., *Prod.* 324 (1810).

Stegostyla hildae (Pescott et Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia hildae* Pescott et Nicholls, *Victorian Naturalist* 45: 235-7, t. (1929).

Stegostyla iridescens (R.S.Rogers) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia iridescens* R.S.Rogers, *Trans. & Proc. Roy. Soc. South Australia* 44: 328-9, t. 13 (1920).

Stegostyla lyallii (Hook.f.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia lyallii* Hook. f., *Fl. nov.-zel.* 1: 247 (1853).

Stegostyla praecox (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia praecox* Nicholls, *Victorian Naturalist* 43: 156-157 (1926).

Stegostyla testacea (R.Br.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia testacea* R.Br., *Prod.* 324 (1810).

Stegostyla transitoria (D.L.Jones) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Caladenia transitoria* D.L.Jones, *Austral. Orch. Res.* 3: 42-43, f. 2.14 (1999).

Acknowledgements

We thank Marion Garratt and Karina FitzGerald for technical expertise, Laurie Adams for the Latin diagnoses, Kirsten Cowley, Lyn Craven and Peter Thrall for comments on the manuscript and Judy West for support of our research. Numerous people have sent specimens over the years, in particular Paul Barnett†, Bob Bates, Andrew Brown, Jeff Campbell, Ralph Crane†, Bill Dowling, Everett Foster, Chris French, Ron Heberle, Bill Jackson, Jeff Jeanes, John Moye, Denzel Murfet, Helen Richards, John Riley, Lewis Roberts, Dean Rouse, Les Rubenach, Ron Tunstall, Hans & Annie Wapstra and Ron Williamson. The directors or curators of AD, AK, BM, BRI, CANB, E, HO, K, L, LINN, MEL, NSW, P, W and WELT are thanked for allowing access to their collections. Many thanks to David Banks for editorial assistance.

Artificial key to the genera of the *Caladenia* Alliance

1 Leaf absent from flowering plants, reduced to a thin, scale-like basal bract; leaves on sterile plants ovate, with prominent white veins ***Praecoxanthus***
1. Leaves similar on both flowering plants and sterile plants, lacking white veins **2**

2 Leaf glabrous or nearly so; leaves of sterile plants with a small, basal, ligule-like growth; petals linear-clavate, densely covered with sessile red glands; labellum sessile ***Leptoceras***
2. Leaf densely hairy; leaves of sterile plants without a basal, ligule-like growth; petals never linear-clavate; labellum clawed or sessile **3**

3 Labellum strongly insectiform; lamina attached by a membranous portion to a rigid, rod-like, pseudo column foot; labellum calli greatly enlarged and irregularly swollen; column wings enlarged medially ***Drakonorchis***
3. Labellum not insectiform; lamina sessile on the column base or with a basal claw; calli neither greatly enlarged nor irregularly swollen; column wings enlarged distally **4**

4 Calli restricted to labellum base **5**
4. Calli extending at least to the labellum mid-lobe **6**

5 Flowers glossy; labellum lamina much reduced, thin to membranous, glabrous; column wings hooded above the anther ***Elythranthera***
5. Flowers dull; labellum lamina well developed, the lateral lobes fleshy, papillate; column wings not extending above the anther ***Glossodia***

6. Tubers wholly enclosed in a multilayered fibrous tunic; flowers usually blue **7**
6 Tubers partly enclosed in a multilayered fibrous tunic; flowers never blue **8**

7 Leaf ovate; flowers opening fully only in warm weather; trichomes terete, eglandular, papillate; labellum calli monomorphic ***Cyanicula***
7. Leaf linear to lanceolate; flowers unreactive to weather conditions; trichomes flattened, eglandular, non-papillate; labellum calli dimorphic ***Pheladenia***

8 Plants growing in spreading clonal colonies; labellum calli clustered, linear, without an expanded head, the bases fused to form a plate-like structure; column wings with a short, free lobule ***Caladenia***
8. Plants growing singly or in loose groups or tufts, never in spreading clonal colonies; labellum calli in rows, with an expanded head, the bases free; column wings entire **9**

9 Flowers usually large and spider-like; tepals usually attenuate, caudate, filiform or clavate distally; trichomes mostly eglandular, with a long, white basal cell **10**
9. Flowers usually small and hand-like; tepals usually obtuse to acute; trichomes mostly glandular, with a short dark basal cell **11**

10 Column base with two prominent yellow gland-like structures ***Arachnorchis***
10. Column base without prominent yellow gland-like structures ***Calonema***

11 Dorsal sepal strongly inarched over the column; labellum calli usually in four or more rows ***Stegostyla***
11. Dorsal sepal erect or recurved, occasionally incurved but never strongly so; labellum calli usually in two rows **12**

12. Labellum cream, white or pink, either lacking bands or with narrow dark red bands ***Petalochilus***
12 Labellum whitish or blue, with numerous narrow dark blue bands **13**

13 Flowers usually blue ***Cyanicula***
13. Flowers white ***Glycorchis***

Literature Cited

- Bentham, G. (1873). *Flora Australiensis*, Vol. 6. L. Reeve & Co, London.
- Bishop, T. (1996). *Field Guide to the Orchids of New South Wales and Victoria*. University of New South Wales Press, Sydney.
- Brown, R. (1810). *Prodromus Florae Novae Hollandiae, et Insulae van Diemen*. J.Johnson & Co., London
- Clements, M.A. (1989). Catalogue of Australian Orchidaceae. *Austral. Orch. Res.* 1: 1-160.
- Clements, M.A. (1995). *Reproductive biology in relation to phylogeny of the Orchidaceae, especially the tribe Diurideae*. PhD thesis. Australian National University, Canberra.
- Clements, M.A., Jones, D.L., Sharma, I.K., Nightingale, M.E., Garratt, M.J., FitzGerald, K.J., Mackenzie, A.M. and Molloy, B.P.J. (in press). Phylogenetic systematics of the Diurideae (Orchidaceae) based on the ITS and 5.8s coding region of nuclear ribosomal DNA, *Lindleyana*.
- Endlicher, S.L. (1846). Orchidaceae. In Lehmann, *Pl. Preiss.* 2: 4-14.
- Farr, E.R., Leussink, J.A. and Stafleu, F.A. (1979). *Index Nominum Genericorum* (*Plantarum*). Vol. 1-3. Bohn, Scheltema & Holkema, Utrecht dr. W. Junk b.v., The Hague.
- George, A.S. (1963). Notes on Western Australian Orchids III. *Elythranthera*, a new genus for the enamel orchids. *Western Australian Naturalist* 9: 3-9.
- Hallé, N. (1977). *Flore de la Nouvelle Calédonie et Depéndances* 8; Orchidacées. Museum National D'Histoire Naturelle, Paris.
- Hoffman, N. and Brown, A.P. (1992, 1998). *Orchids of south-west Australia*. University of Western Australia Press, Nedlands.
- Hopper, S.D. and Brown, A.P. (2000). New genera, combinations, and species in the *Caladenia* alliance (Orchidaceae: Diurideae). *Lindleyana* 15(2): 120-126.
- Hopper, S.D. and Brown, A.P. (in press). *Nuytsia*.
- Jones, D.L. (1988). *Australian Native Orchids*. Reed Books, Sydney.
- Jones, D.L. (1991) New taxa of Australian Orchidaceae. *Austral. Orch. Res.*, 2: 1-208.
- Jones, D.L. (1994). New Species of Orchidaceae from South-eastern Australia. *Muelleria* 8(2): 177-192.
- Jones, D.L. (1996). Reinstatement of *Caladenia alpina* R.S.Rogers (Orchidaceae) as distinct from *C. lyallii* Hook. f. and the description of *Caladenia cracens*, a related new species from southern Tasmania. *Muelleria* 9: 41-50.
- Jones, D.L. (1997). Towards a revision of the *Caladenia dilatata* R. Br. (Orchidaceae) complex - 1: The *Caladenia dilatata* Alliance. *Orchadian* 12(4): 157-171.
- Jones, D.L. (1999). Eight new species of *Caladenia* R.Br. (Orchidaceae) from eastern Australia. *Orchadian* 13(1): 4-24.
- Jones, D.L. (2000). Four new names in *Caladenia* R.Br. (Orchidaceae), and a note on *Caladenia carnea* var. *subulata*. *Orchadian* 13(6): 255-257.
- Jones, D.L. (2001). Tribe Diurideae. In. A.M.Pridgeon, P.J.Cribb, M.W.Chase and F.N.Rasmussen (eds.). *Genera Orchidacearum* Vol. 2., Orchidoideae (Part one). Oxford University Press, Oxford.
- Jones, D.L., Molloy, B.P.J. & Clements, M.A. (1997). Three new species and a new combination in *Caladenia* R. Br. (Orchidaceae) from New Zealand. *Orchadian* 12(5): 221-228.
- Jones, D.L. & Clements, M.A. (1999). *Caladenia actensis* (Orchidaceae), a new species from the Australian Capital Territory. *Orchadian* 12(11): 522-523.
- Lindley, J. (1840a). A Sketch of the Vegetation of the Swan River Colony. *Edwards's Bot. Reg.* 1-23: Swan Riv. Append. xlvi-lvii.
- Lindley, J. (1840b). *The Genera and Species of Orchidaceous Plants*. 1963 reprint, A. Asher & Coy, Amsterdam.
- Pfitzer, E.H.H. (1889). Orchidaceae. In A.Engler and K. Prantl (eds). *Die Natürlichen Pflanzenfamilien*. Leipzig.
- Szlachetko, D.L. (2001). Genera et species Orchidalium. 1. *Polish Bot. J.* 46(1): 11-26.

✿

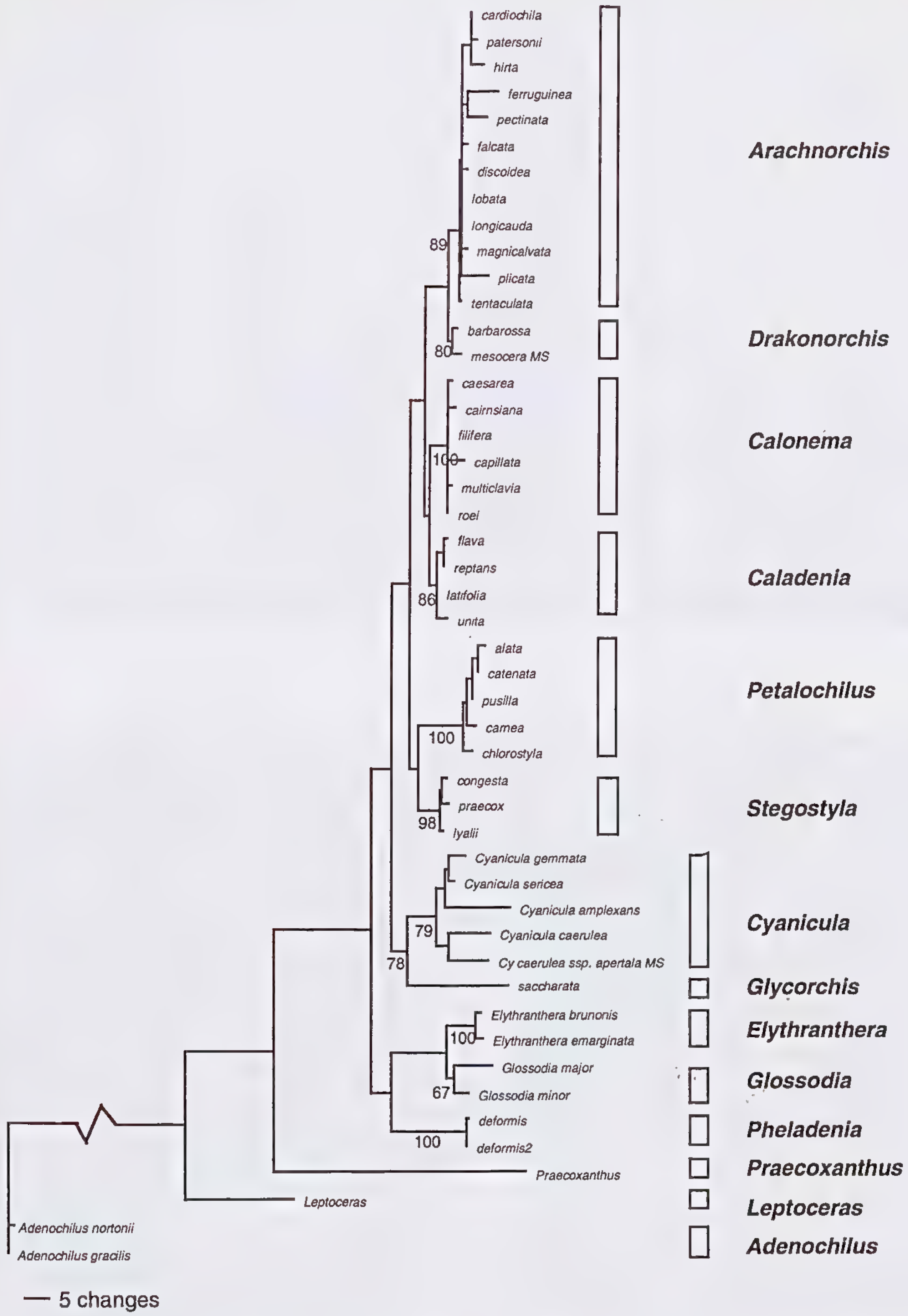
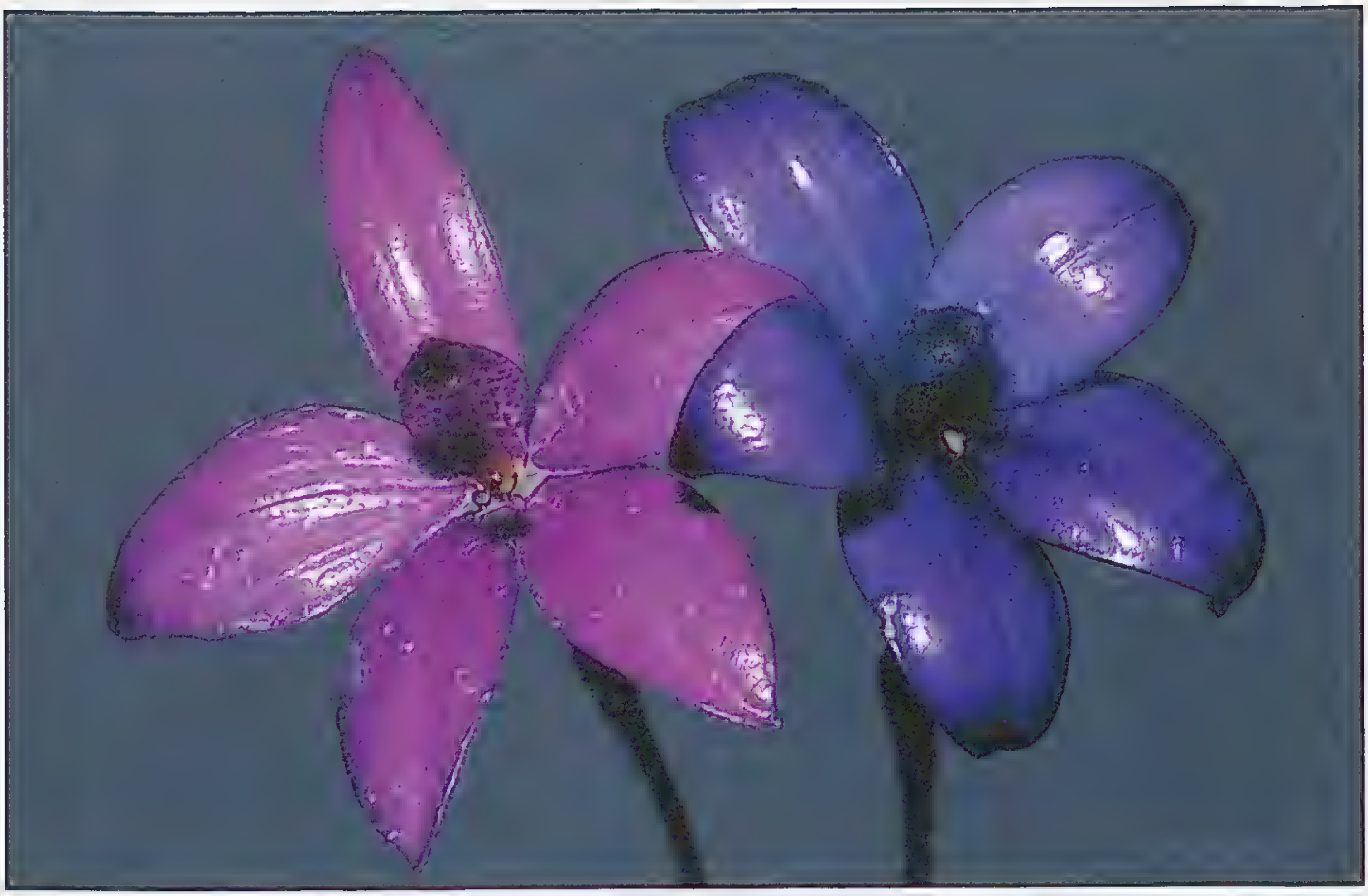
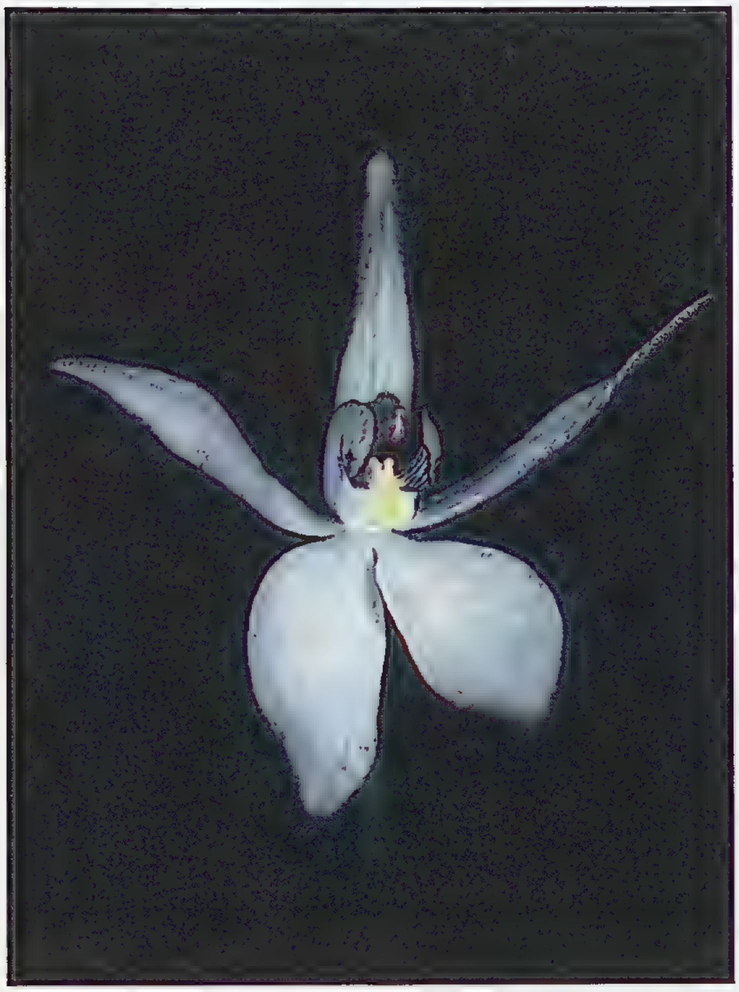


Fig. 1. Phylogeny of the Caladeniinae generated from analysis of the ITS* (see below) nuclear genomic region of 48 representative species using *Adenochilus* as the outgroup. The single successively weighted tree was generated based on the 35 most parsimonious trees, where all gaps were removed from the data matrix. Branch lengths are indicative of nucleotide substitution levels and support (bootstrap values) for each genus is shown below the relevant branches. *(internal transcribed spacers, ITS1 and ITS2, are two non-coding regions flanked by the 18S and 26S nrDNA coding regions and "containing" the highly conserved 5.8S coding region).



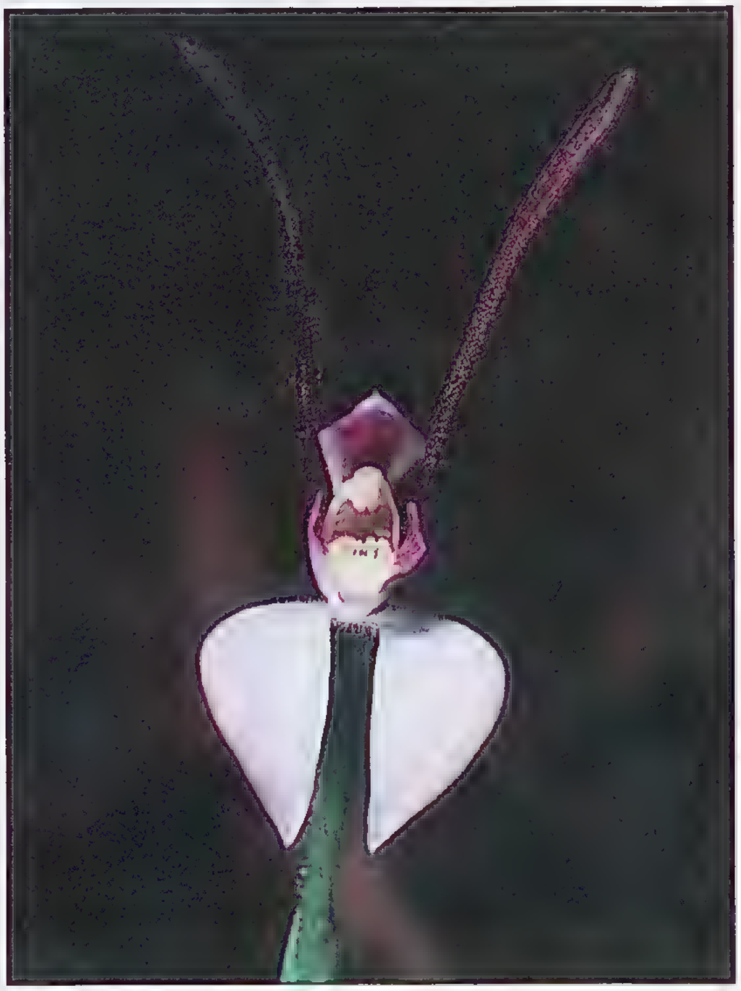
M.A. Clements

Elythranthera emarginata (left) and ***Elythranthera brunonis*** (right)
from Margaret River, Western Australia



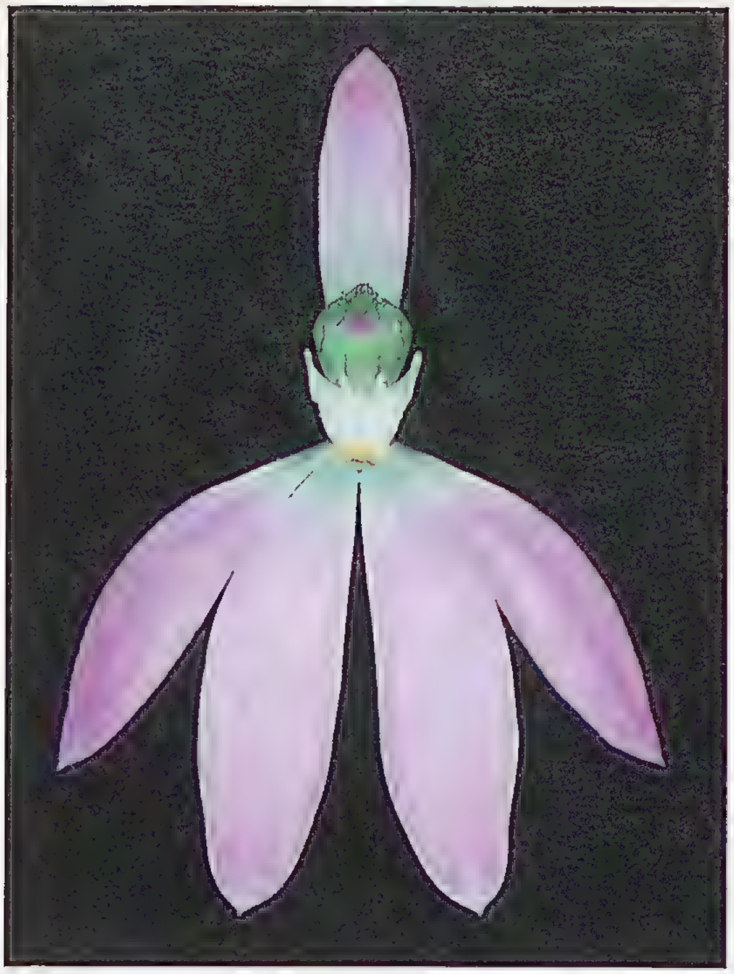
M.A. Clements

Glycorchis saccharata
from Koodjee Nature Res., Western Australia



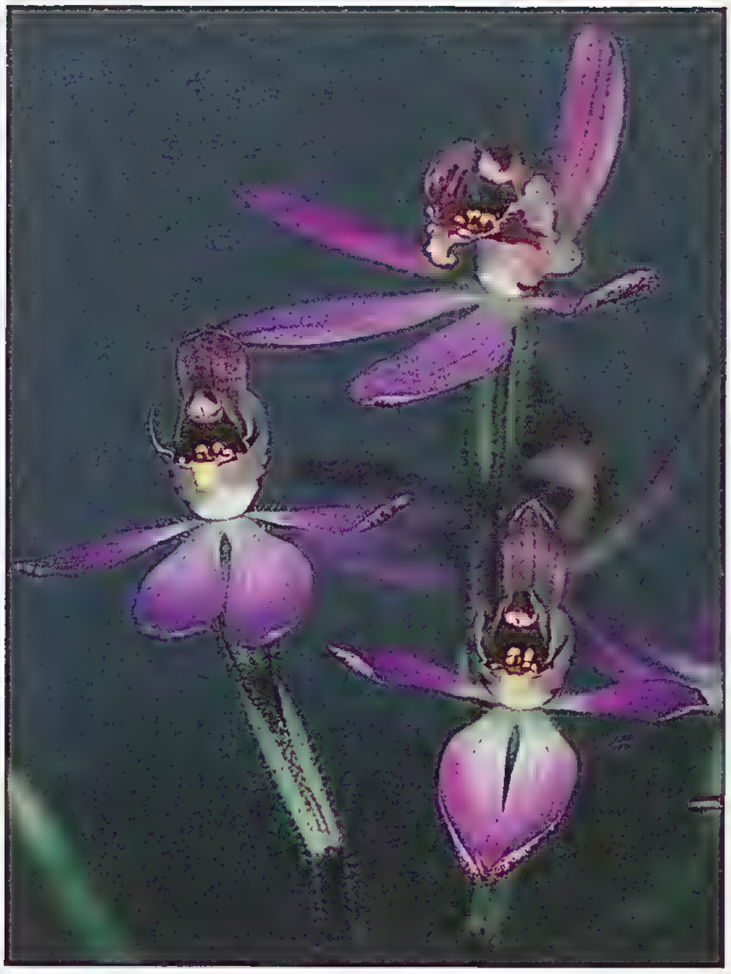
D. Titmuss

Leptoceras menziesii
from Anglesea, Victoria



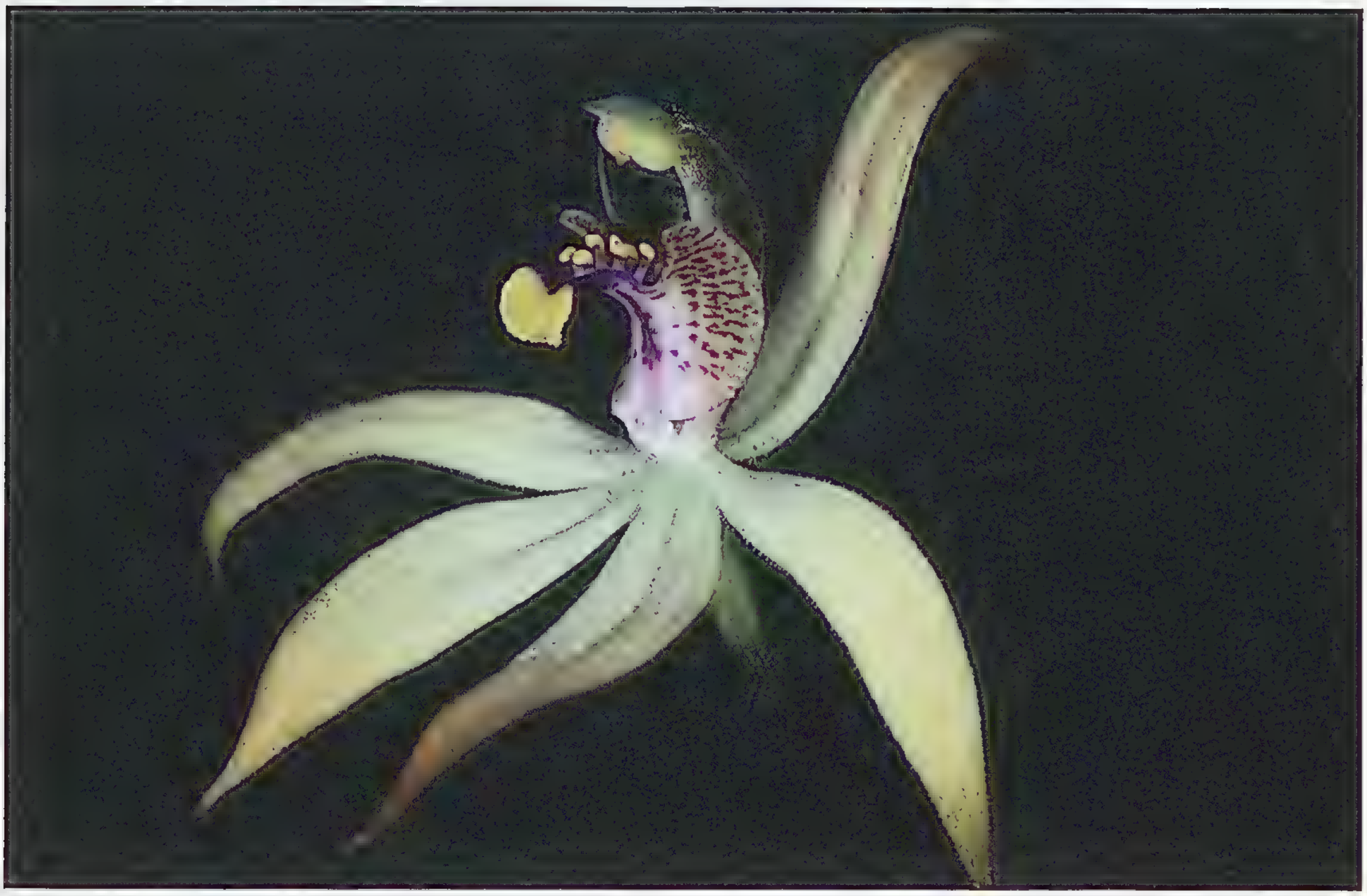
D.P. Banks

Petalochilus catenatus
from Cattai, New South Wales



M.A. Clements

Petalochilus pusillus
from King Island, Tasmania



M.A. Clements

Praecoxanthus aphyllus
from near Esperance, Western Australia

Oncophyllum, a New Genus of Orchidaceae from Australia

David L. Jones & Mark A. Clements
Centre for Plant Biodiversity Research,
GPO Box 1600, Canberra, ACT 2601, Australia.

Abstract

Oncophyllum is erected for two species of Orchidaceae from Australia previously placed in *Bulbophyllum* Thouars, with *Bulbophyllum minutissimum* F. Muell. as the type of the new genus.

Introduction

The genus *Bulbophyllum* was described by the French botanist de Petit-Thouars based on plants collected in Réunion and Mauritius (Thouars 1809, 1822). In all, Thouars described 18 species of *Bulbophyllum* one of which, *B. nutans* Thouars, was later designated as the type of the genus. Modern studies of the genus indicate that it contains between 1200 and 2200 species (Dressler 1981, 1993, Vermeulen 1987, 1991, 1993) making it one of the largest genera of orchids. Traditionally *Bulbophyllum* has been characterised as being composed of epiphytic herbs with solid, single-node pseudobulbs; 1-3 leaves; a racemose inflorescence; an articulate labellum; and, 2-4 waxy, coherent pollinia (Lindley 1830-40, Reichenbach 1861, Bentham & Hooker 1883, Hooker 1890). Some recent studies of the genus have maintained a conservative view (Seidenfaden 1979, Vermeulen 1987, 1991, 1993), resulting in a large genus with a complex and unwieldy infrageneric classification. Others have treated the genus in a narrower sense and recognise a number of segregate genera (Senghas 1978, 1983, Garay *et al.* 1994, Garay & Kittridge 1995). Based on our studies of floral morphology, vegetative habit and biology, we recognise *Bulbophyllum* in the narrow sense; i.e. plants with branching, indeterminate roots arising only from two or three nodes closest to the pseudobulb; solid pseudobulbs; two terminal leaves; a racemose inflorescence arising from the base of a pseudobulb; and, flowers which have a hinged labellum.

We have been carrying out studies into taxa of *Bulbophyllum* occurring in Australia, New Caledonia and New Zealand. Clements (1989) lists 28 species of *Bulbophyllum* from Australia and a further 4 species have been described from there since (Gray & Jones 1989, 1991, Jones 1993). Harrison (2000) provides a comprehensive overall coverage of the genus in Australia. Two species occur in New Zealand (Moore & Edgar 1970, St George 1999) and 16 species in New Caledonia (Hallé 1977). During our studies the question of disparity within the genus *Bulbophyllum* came to light following the recognition of some unique characters that have been overlooked by previous workers (e.g. Dockrill 1995). Results of molecular analyses of the Dendrobieae, based on the ITS nuclear region, which also included representatives of the Bulbophyllinae (including *Bulbophyllum nutans*), support the morphological studies. The results reveal that the Bulbophyllinae is not be monophyletic with a number of highly divergent lineages apparent. In particular, they also show that *B. moniliforme* Parish & Rchb.f., an Asian species previously linked with *B. minutissimum* and *B. globuliforme* on the basis of presumed similarities of pseudobulb morphology, is completely separated from Australian elements of the subtribe. The opportunity is taken here to describe a small genus of two species, which exhibit striking differences from *Bulbophyllum, sensu stricto.*

Materials and Methods

Live plants of *Bulbophyllum nutans* Thouars - the designated type of the genus - were imported from Mauritius and grown in the glasshouses at the Australian National Botanic Gardens, Canberra. A study of the vegetative habit and floral morphology of these plants has enabled us to define *Bulbophyllum* in the strict sense. Comparisons have been made with living plants of Australian, New Zealand, New Guinean and New Caledonian species from various sections of *Bulbophyllum sensu lato.* The type specimens of all pertinent taxa have been examined.

Taxonomy

Oncophyllum D.L.Jones & M.A.Clem., *gen. nov.*
Orchides epiphyticae vel lithophyticae tegetes formantes; rhizoma filiforme, ramulosum; radices filiformes, e rhizomate ad basin pseudobulbi oriens; pseudobulbi parvi, ovoidei ad globosi vel complanati, laeves, cavi stomatibus internis; folium reductum, ephemerum vel non, papyraceum; inflorescentia 1-flora, e basi pseudobulbi oriens, solitaria, axe filiformi;

ovarium minute tuberculatum; flores parvi, resupinati; sepala ad basin conjuncta, eis lateralibus cum pede columnae mentum formantibus; labellum carnosum, curvatum, cum cardine ad apicem pedis columnae; columna multo reducta, alata; pes columnae curvatus; pollinia 4, aurantia, ceracea; capsula tuberculata.

Bulbophyllum Thours sect. *Minutissima* Pfitzer *Die Natürlichen Pflanzenfamilien*, II. Teil, 6. Abteilung 180 (1889). Type species: *Bulbophyllum minutissimum* F.Muell.

Type species: *Oncophyllum minutissimum* (F.Muell.) D.L.Jones & M.A.Clem. (*Bulbophyllum minutissimum* F.Muell.).

Epiphytic or lithophytic orchids forming spreading mats consisting of moniliform strands of pseudobulbs linked by rhizomes; rhizome filiform, branched; roots filiform, determinate, short, arising from the rhizome at the base of a pseudobulb; pseudobulbs tiny, ovoid to globose or flattened, smooth with an apical cavity containing internal stomata; leaf much reduced, ephemeral, papyraceous; inflorescence 1-flowered, arising singly from the base of a pseudobulb, the axis filiform; ovary minutely tuberculate; flowers small, resupinate; sepals united at the base, the lateral sepals forming a mentum with the column foot; labellum fleshy, curved, hinged to the apex of the column foot; column short, winged; column foot curved; pollinia 4, orange, waxy; capsule tuberculate.

Etymology

The generic name is derived from the Greek *oncos* (swollen) and *phyllon* (a leaf). The pseudobulbs which have an apical cavity containing internal stomata are more suggestive of a swollen leaf rather than a swollen stem.

Recognition

The genus is characterised by unbranched, determinate roots which are very short (10-30 mm long); two roots per pseudobulb, each arising from a separate node; a short stem (1.5-8 mm long) between each pseudobulb consisting of two nodes, a further two crowded nodes on the stem beneath each pseudobulb; tiny pseudobulbs (1-3 mm diameter) which have an invaginated apical cavity containing stomata (Pfitzer 1884, Schwartz 1997); a solitary much-reduced, papyraceous ephemeral leaf; and, a solitary, single-flowered inflorescence arising from the base of a pseudobulb.

The genus differs from *Bulbophyllum sensu stricto*, in its modified root system (very short, determinate, unbranched roots, two per pseudobulb, each arising from a separate node); tiny pseudobulbs which have an apical cavity containing internal stomata; a solitary much-reduced, papyraceous ephemeral leaf; and, a solitary, single-flowered inflorescence arising potentially from the base of each pseudobulb.

Distribution

A genus of two species, both endemic in eastern Australia.

New Combinations:

Oncophyllum minutissimum (F.Muell.) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Bulbophyllum minutissimum* F.Muell., *Fragm.* 11: 53 (1878); *Dendrobium minutissimum* F.Muell., *Fragm.* 5: 95 (1865), *nom. nud.*; *Phyllorchis minutissima* (F.Muell.) Kuntze, *Revis. gen. pl.* 2: 677 (1891).
Types: 'ad ostium fluminus Richmond River', *C.Fawcett* (lectotype: MEL!, *fide* Clements 1989; isolectotype, BM!, K!). 'in the vicinity of Port Jackson', *W.S.Macleay,* (syntype, MEL!). Figures 1-4.

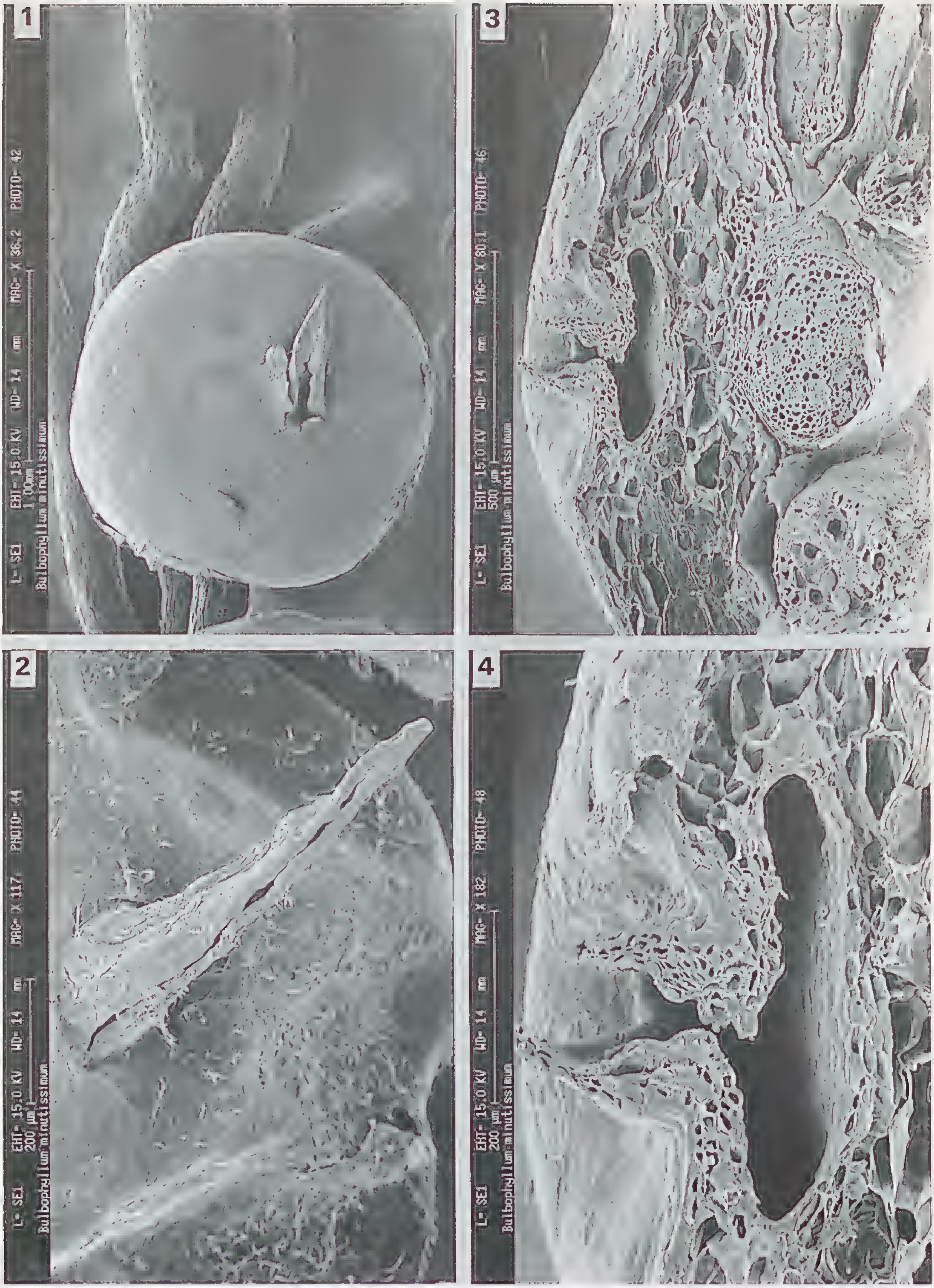
Illustrations

Nicholls (1969), plate 437, as *Bulbophyllum minutissimum*; Dockrill (1995), plate 105, as *Bulbophyllum minutissimum.*

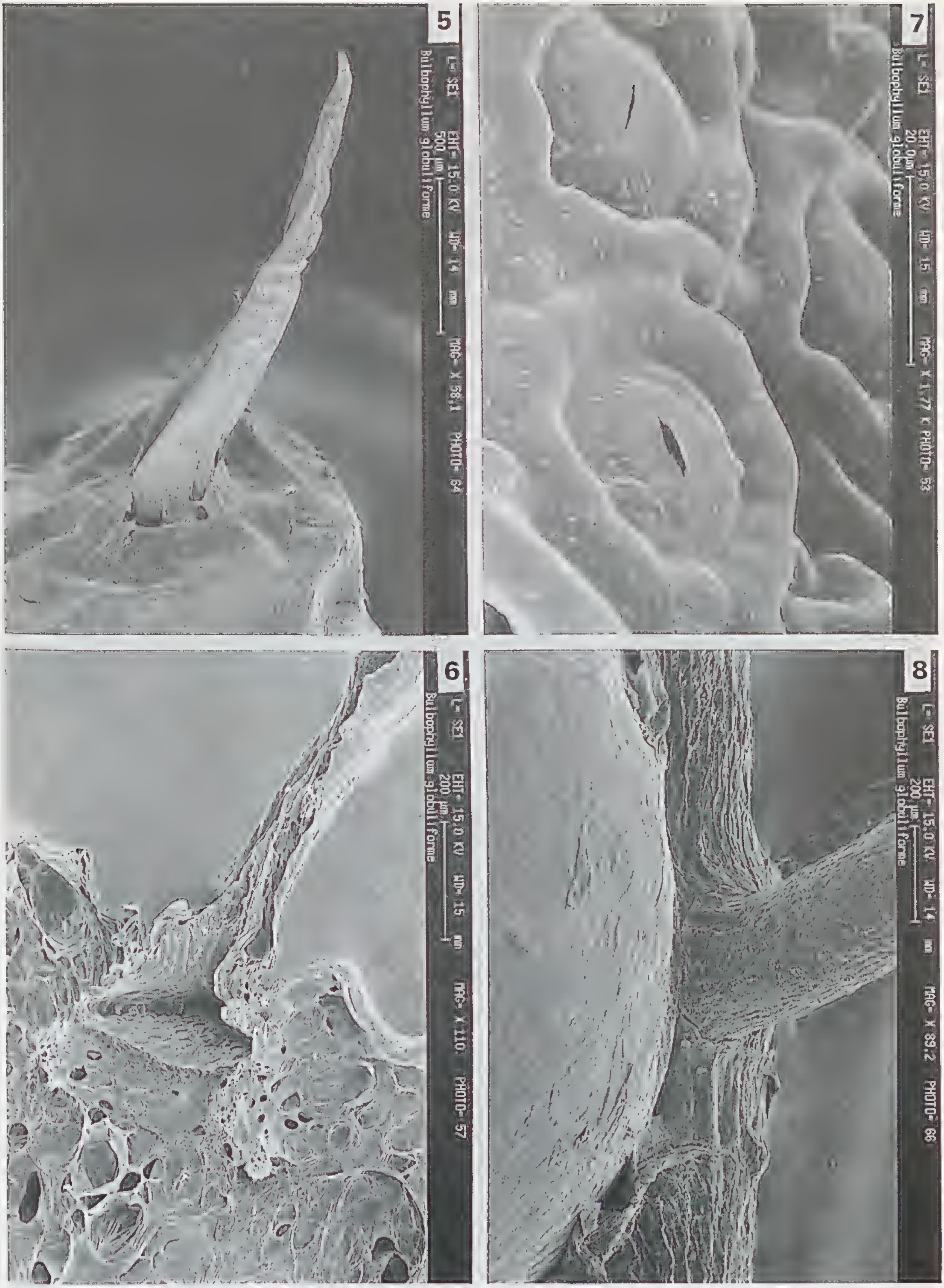
Distribution and ecology

Endemic to Australia where occurring in central-eastern and south-eastern Queensland and north-eastern to south-eastern New South Wales. Grows on trees and rocks in a range of habitats including moist gorges, exposed escarpments, littoral rainforest, mangroves, sclerophyll forest and woodland, and isolated trees in cleared paddocks.

Oncophyllum globuliforme (Nicholls) D.L.Jones et M.A.Clem., *comb. nov.*
Basionym: *Bulbophyllum globuliforme* Nicholls, *Orchidol. Zeylandica.* 5: 123-4, f.1 (1938).
Type: One mile this (NSW) side of the Queensland border and about 1 mile west of the Sydney-Brisbane railway line, Jan. 1937, *A.W. Dockrill* (holotype, MEL!; isotype, NSW!). Figures 5-8.


1
L= SEI EHT= 15.0 KV WD= 14 mm MAG= X 36.2 PHOTO= 42
1.00mm
Bulbophyllum minutissimum
3
L= SEI EHT= 15.0 KV WD= 14 mm MAG= X 80.1 PHOTO= 46
500 µm
Bulbophyllum minutissimum
2
L= SEI EHT= 15.0 KV WD= 14 mm MAG= X 117 PHOTO= 44
200 µm
Bulbophyllum minutissimum
4
L= SEI EHT= 15.0 KV WD= 14 mm MAG= X 182 PHOTO= 48
200 µm
Bulbophyllum minutissimum

Figs. 1-4, *Oncophyllum minutissimum*.
Fig. 1. Pseudobulb and ephemeral leaf, from above. Fig. 2. Top of pseudobulb and ephemeral leaf. Fig. 3. longitudinal section through pseudobulb showing apical cavity. Fig. 4. Apical cavity.


5
L= SEI EHT= 15.0 KV WD= 14 mm MAG= X 58.1 PHOTO= 64
500 µm
Bulbophyllum globuliforme
7
L= SEI EHT= 15.0 KV WD= 15 mm MAG= X 1.77 K PHOTO= 53
20.0µm
Bulbophyllum globuliforme
6
L= SEI EHT= 15.0 KV WD= 15 mm MAG= X 110. PHOTO= 57
200 µm
Bulbophyllum globuliforme
8
L= SEI EHT= 15.0 KV WD= 14 mm MAG= X 89.2 PHOTO= 66
200 µm
Bulbophyllum globuliforme

Figs 5-8, *Oncophyllum globuliforme*.

Fig. 5. Top of pseudobulb and ephemeral leaf. Fig. 6. Section through top of pseudobulb showing apical cavity. Fig. 7. Stomata on the wall of the internal cavity. Fig. 8. Base of pseudobulb, section of rhizome and base of root.

Illustrations

Nicholls (1969), plate 438, as *Bulbophyllum globuliforme*; Dockrill (1995), plate 101, as *Bulbophyllum minutissimum* (blooming plant).

Distribution and ecology

Australia: central-eastern and south-eastern Queensland, north-eastern New South Wales. Grows on the branches of *Araucaria cunninghamii* at moderate altitudes.

Acknowledgements

We wish to thank Corinna Broers, Marion Garratt, Karina FitzGerald, Roger Heady and Susan Walker for technical assistance, Helen Hewson, Ben Wallace and Lyn Craven for commenting on the manuscript, John Roberts, Ralph Crane†, Darryl Smedley, David Banks, Michael Harrison and Eric Leilkajis for plant material and Alex George for the Latin translation.

References

- Bentham, G. & Hooker, J.D. (1883). *Genera Plantarum,* vol. 3. (Reeve & Co., London).
- Clements, M.A. (1989). Catalogue of Australian Orchidaceae, *Austral. Orchid Res.* 1: 1-160.
- Dockrill, A.W. (1995). *Australian Indigenous Orchids*, vol. 2. (Surrey Beatty & Sons Pty Ltd, Sydney).
- Dressler, R.L. (1981). *The Orchids, Natural History and Classification.* (Harvard University Press, Cambridge).
- Dressler, R.L. (1993). *Phylogeny and Classification of the Orchid Family.* (Dioscorides Press, Portland).
- Garay, L.A., Hamer, F. & Siegerist, E.S. (1994). The genus *Cirrhopetalum* and the genera of the *Bulbophyllum* alliance. *Nord. J. Bot.* 14(6): 609-646.
- Garay, L.A. & Kittridge, W.. (1995). Notes from the Ames Orchid Herbarium. *Bot. Mus. Leafl. Harvard Univ.* 30(3): 47-59.
- Gray, B. & Jones, D.L. (1989). New species of *Bulbophyllum* section *Oxysepalum* (Orchidaceae) in Australia. *Austrobaileya* 3(1): 141-8.
- Gray, B. & Jones, D.L. (1991). A new species of *Bulbophyllum* Thouars, section *Micromonanthe* (Orchidaceae) from north-eastern Queensland. *Austrobaileya* 3(3): 331-3.
- Hallé, N. (1977). *Flore de la Nouvelle-Caledonie* vol. 8. (Museum National d'Histoire Naturelle, Paris).
- Harrison, M. (2000). Australian *Bulbophyllum* species. Proc. *Fourth Australian Native Orchid Conference* pp. 65-81.
- Hooker, J.D. (1890). *Flora of British India.* (Reeve & Co., Ltd., London).
- Jones, D.L. (1993). A new species of *Bulbophyllum* Thouars, section *Oxysepalum* (Orchidaceae) from Australia. *Phytologia* 74(4): 289-92.
- Lindley, J. (1830-40). *Genera and Species of Orchidaceous Plants.* (Ridgways, London).
- Moore, L.B. & Edgar, E. 1970. *Flora of New Zealand,* vol. 2. (Government Printer, Wellington).
- Nicholls, W.H. (1969). *Orchids of Australia.* (Thomas Nelson, Melbourne).
- Pfitzer, E. (1889). Orchidaceae. In Engler and Prantl, *Die Natürlichen Pflanzenfamilien*, II. Teil, 6. Abteilung, Leipzig.
- Reichenbach, H.G. (1861). *Bolbophyllum* in Walp., *Ann. Bot.* 6: 243-265.
- Schwartz, O.M. (1997). The anatomy of the pseudobulb cavities of *Bulbophyllum minutissimum and B. globuliforme. Orchadian* 12(5): 230-232.
- Seidenfaden, G. (1979). Orchid Genera in Thailand VIII. *Dansk Bot. Arkiv.* 33(3): 1-228.
- Senghas, K. (1978). *Hapalochilus*, eine alte, Neue Orchideengattung aus Neu-Guinea. *Die Orchidee* 29:245-8.
- Senghas, K. (1983). Subtribus: Bulbophyllinae, in Schltr. *Die Orchideen* 1(13): 753-779.
- St George, I. (1999). *The Nature Guide to New Zealand Native Orchids.* Random House, Auckland.
- Thouars, L.M.A.A. Du Petit-. (1809). Extrait de trois Memoires lus a la premiere classe de L'Institut, sur l'histoire des plantes orchidees des iles australes d'Afrique, Nouv. *Bull. Sci. Soc. Philom.* Paris 1: 314-9.
- Thouars L.M.A.A. Du Petit-. (1822). Histoire Particuliere des Plantes Orchidees rescueilies sur las Trois iles Asutrales D'Afrique. (L'Auteur, Arthus Bertrand, Treuttel et Wurtz, Paris).
- Vermeulen, J.J. (1987). A taxonomic revision of the continental African Bulbophyllinae. *Orch. Monographs* 2: 1-300.
- Vermeulen, J.J. (1991). Orchids of Borneo, vol 2. (Toihaan Publ. Co. Sdn. Bhd., Kota Kinabalu).
- Vermeulen, J.J. (1993). A taxonomic revision of *Bulbophyllum*, sections *Adelopetalum, Lepanthanthe, Macrouris, Pelma, Peltopus*, and *Uncifera* (Orchidaceae). *Orch. Monographs* 7:1-324.

A Bit About *Sarcochilus australis*

Gerry Walsh
46A Fourth Avenue, Llandilo NSW 2747

The first thing anyone should say about *Sarcochilus australis* is that this is one very beautiful Australian native species. It is not "one of your botanicals' as the expression goes. The second obvious point is that *S. australis* is notoriously difficult to maintain in captivity. It's reputation for going belly-up is legendary. But I believe it is no more of a problem to cultivate then most other 'twig epiphytes', in particular, other members of the *Sarcochilus* genus.

There are other members of this genus that I can slaughter with equal panache; *S. spathulatus* and *S. dilatatus* are the most likely contenders for the title. And I can throw *S. serrulatus* and *S. parviflorus* into the ring with those as well. My longevity record with *S. australis* is six years. And I must confess that I doubt the others I've mentioned have lasted that long I don't really know for sure. It's just that *S. australis* has the reputation and so it's the one I've watched.

There are reasons for this dastardly reputation though. The main thing to remember is that *S. australis* is a very common orchid. The other four I've mentioned are much less encountered in the wild with the exception *of S. spathulatus*, which can be locally abundant but still not as common as *S. australis.*

Enthusiasts frequently find dozens of plants laying about the floor of a suitable gully. Most cart them off home rather then let them perish wastefully. But inevitably the rescued plants will succumb, with dry skeletal remains in evidence all around the bushhouse. And so it appears to the hapless grower that so many plants have slipped over the brink into oblivion. The conclusion? "This cursed *S. australis* must be impossible to grow!"

S. australis is distributed from the Hunter River in Central NSW, southwards into Victoria and across Bass Strait into Tasmania. Isolated plants have been found up as far as the Qld border but it can be considered to be 'rare' north of the Hunter. This river separates the vast Central NSW sandstone belt from the rest of NSW.

From the moment you cross south over the Hunter into the sandstone country you are likely to see colonies of *S. australis* anywhere. With a few notable exceptions, it continues along southward into Victoria sticking more or less to the eastern coast.

The most baffling exception is in the Illawarra. I've scratched my head for many years over this enigma. And driven others mad with the inevitable question: "Have you ever seen a single plant of *S. australis* on the escarpment between the Royal National Park and the Shoalhaven River?" This encompasses a distance of over a hundred kms of awesome native orchid country.

You can find every other epiphytic species that is known to occur south of the Hunter in the Illawarra with the exception of *Dockrillia fairfaxii* (Blue Mts), *Dendrobium gracilicaule* (Hawkesbury) and *Sarcochilus spathulatus* (Watagans). But no one I've discussed the problem with would swear to ever having seen a definite plant of *S. australis* on the coastal ranges.

In the gorge country around Campbelltown, a major south-western suburb of Sydney, *S. australis* can be quite common. And it probably occurs in the vast stretches of Water Board catchment high up behind the coastal ranges. Once you travel down towards Ulladulla and Bateman's Bay it makes a huge comeback.

The escarpment supports some of the finest stands of rainforest in NSW, along with vast sandstone cliff lines that give birth to numerous creeks and gullies. The majority seem indistinguishable from spots just an hours' drive away which are simply infested with *S. australis.*

Down in my hometown of Kangaroo Valley, I've spent most of my life slipping and sliding around leaping creeks, dank gullies and mossy cliffs. (My father once declared that I would surely turn into an eel if I didn't return to the sunlight). But that sort of country is in my soul and as a result I've seen some incredible sights in my native orchid life. But I'm yet to see a single plant of *S. australis* in home territory. Why?

It is certainly not uncommon in north-eastern Gippsland. On a visit to this region in July 1995, I observed numerous plants, mostly near to sea level, but some at mid altitudes as well. The general environment was certainly similar *to S. australis* habitat in the Blue Mountains.

It is also found in the Otway Ranges, well to the west of Melbourne. This is the pointy bit that sticks out to the south just as the coast heads off north-westerly towards South Australia. I investigated a couple of likely spots but found nothing. A few miles further along I noticed odd plants hanging from trees beside the main road usually as we crossed through damp gullies. At another point on a damp ridge top there was one of the largest specimens of *S. australis* I've ever seen hanging by one root just three metres from the asphalt.

I haven't been across to the Apple Isle but I believe it's common about the East coast so long as you're in just the right spot. Thereby lays the secret of finding *S. australis* in the wild. You must be 'in the right spot'.

What elements does this magic "spot" possess? I doubt that any person could give a blanket answer to this vexing question . . . but I'll have a crack at telling you. If you are searching the great sandstone regions around Sydney, such as the Blue Mts or the Kuringai area, your colony is 90% certain to have set up home on *Backhousia myrtifolia* (common myrtle) or *Tristania laurina* (water gum).

Virtually every gully in this vast system is choked with one or both of these species. If you are seeing plenty of *Plectorrhiza tridentata* and *Sarcochilus hillii* on these same tree species, then you're in with a chance of finding *S. australis* amongst them. On the myrtles you'll no doubt be seeing a good few specimens of *Dendrobium aemulum* as well.

Water gums right in or lining the banks of creeks do often harbour huge colonies of *S. australis*. But I believe myrtle to be a much more common host tree. They won't necessarily be hanging over running water either. You could be just on that fringe line between cool myrtle gully and mixed sclerophyll-heath type bush. Such gullies usually only require two or three steps for a searcher to pass from one environment into the other.

Another species that commonly holds good numbers of *S. australis* is a kind of rambling, prickly shrub that often lines dry, grassy gullies in steep country, and of which I have no idea what it's real identity could be.

It has thorns around one cm long and virtually always has dry moss and that old man's beard moss all through it's messy branches and particularly on the match thick twigs. But *S. australis* does occur sparingly on a wide variety of other hosts within the major environments discussed.

Then again you may be under a canopy of Coachwood rainforest, or other typically rainforest type tree species. Here you'll find plants on the twigs that fall from high up in the canopy.

S. australis is a common orchid, but do not be deluded you could expire from old age while searching out your first colony! I cannot think of another species that sets up a 'members only' enclave quite as selectively as *S. australis* does. It is an absolute snob.

While stumbling about a likely gully, you may not see a single specimen of S. *australis*. Within metres you could be staring dumb-stricken at hundreds of plants. And while you're doing an Indian rain-dance at your long overdue success you may take a couple of steps too far and loose sight of the lot in the blink of an eye.

I don't think I've ever seen a colony that extended beyond 20 metres or so along a creek. To the eye, conditions appear to be identical within and out of the colony. Another hundred metres away you could very likely walk into another big colony. Or you may not see any more for the rest of the day. And no doubt you'll be seeing plenty of other native orchids along the way.

While some colonies can be measured by the hundreds of plants, most seem to consist of just a few dozen specimens. I doubt there could be any other reason for this quirky selectiveness other then the presence of a suitable fungus for seed germination.

As I stated before, *S. australis* is a 'twig dweller'. It mostly seeks out little branches and even vines that are thinner then a broom stick. Plants are often seen on wood no thicker then a match. Their roots will travel for over a metre along such thin twigs and when several roots join up and travel together the host twig is often camouflaged.

S. australis will fairly often attach itself to much thicker trunks and branches up to 15 cms wide. And when it does so, this species can grow into quite a substantial size. I have seen single lead plants 25 cms across with a dozen leaves up to 13 cms long and 2 cms wide. I stress that this is exceptional. An average plant of *S. australis* would only have three or four leaves of perhaps 5 to 8 cms length.

The majority of plants in a colony would be much smaller then the 'average' however. For S. australis appears to be a very fertile species that produces lots of offspring. Young plants flower at amazingly small sizes 20 cent piece size. Racemes on such tiny plants rarely support more then 2 flowers however.

Average raceme length is non-existent with S. australis. Anything is possible right to the upper limit of 22 cms or 9 inches. This may sound outlandish to novice growers but it is true. Last November I was amongst hundreds of flowering plants in the Megalong Valley and some racemes were around 18 cms long, many were over 12 cms and all the others got randomly smaller until seedlings only sprouted the single flower.

S. australis will kieki only infrequently but when it does it can throw up a dozen or so racemes. Single lead plants often have two racemes on board even smallish plants. Flowers are quite variable. Some are up to an inch deep while others may be half this. Some are squat and nearly wider then deep.

Colour is a lottery. The two basic background colours of the segments are bright but light green, and light brown/tan. The large labellum is usually snow white with red striations on the side lobes and a deep purplish spot on the mid lobe. Sometimes there is also a purplish spot on each side lobe. In the Blue Mts, plants are flowering at their best from November right up to Christmas.

So now you want to know how to grow this delightful species . . . don't you? Well don't look at me too hard. The plant that lasted six years for me was tied onto a strip of ironbark totem and the roots eventually reached around 30 cms long. Like all the Sarcs that drop dead with SSDS (Sudden Sarc Death Syndrome} it all relates back to the crown. That's where they die. I don't think there is a cure or a preventative.

I've also had success for up to three years by attaching smallish plants to thin lengths of bamboo with a few strands of epiphytic moss hanging loosely over them. The roots romp away over the shiny surface and attach very well. But the crown will one day rot out.

This seems like a good time to sprout off a bit of philosophy on conservation and the ethics of taking plants out of the bush etc. *S. australis* is not programmed to last long. In the wild it germinates in great abundance, it grows roots from the protocorm with surprising speed and flowers from tiny plants. It does this because it mostly germinates on thin twigs that often die and fall to the ground in short time with the orchid on board. Life is designed to be short for *S. australis* and it lives life to the full and generally dies young.

Unless you've explored a large colony and seen the high number of plants that lie on the ground or are already dead from doing so, you probably won't go along with what I'm preaching. But I see no harm in picking up these plants and having a go at extending their life. If plants have seed pods on board, and they often do, I prop them back up in a suitable limb so that seed dispersal will proceed at least one more time in the orchid's life.

With this approach I only refer to those twig epiphytes that are doomed. Don't be an idiot and take secure plants. The little ones inevitably establish quicker and last longer then the big daddys do anyway. Be happy with windfall plants and let the rest live on. You'll feel very satisfied with your self-control once you get the evacuees up and growing, either in yours or in a friends' bushhouses.

I believe that native orchids, the epiphytes at least, and in NSW at any rate, are probably in very good shape conservation wise. Think about it... twenty years ago there were nurseries all over the place selling them. Particularly around the North Coast and the Mid North Coast. You could buy just about any species you wanted. You can't do that nowadays. In 1983, rainforest logging was stopped in NSW. This virtually dried up the supply in short time. You still see odd species for sale here and there especially in the big chain stores. Qld was supposedly the source of all the plants. It does seem like that state is way behind the rest. Only recently their Minister for Lands, or some such title, was all over the TV because of his dubious land clearing operations. There is no more rainforest logging up there now either I believe.

You can't tell me that there is anything like the vast numbers of orchids coming out of the wild today that there was a decade or two ago. But still some people beat their drums and rattle their sabres when they hear of someone going bush for a few days. There is an automatic assumption that people like myself are intent on sweeping through the back blocks like a swarm of plague locusts. It just ain't like that dear reader.

I have digressed far enough. Back to the real world. Just be honest and conserve our native orchids because, like I've said before, they don't grow on trees . . .

THE Orchid pot co.
SUPPLIERS TO ORCHID GROWERS STRIVING FOR THE ELUSIVE GOAL OF GRAND CHAMPION

SQUARE VANDA POTS
165mm x 165mm x 80mm
100mm x 100mm x 60mm

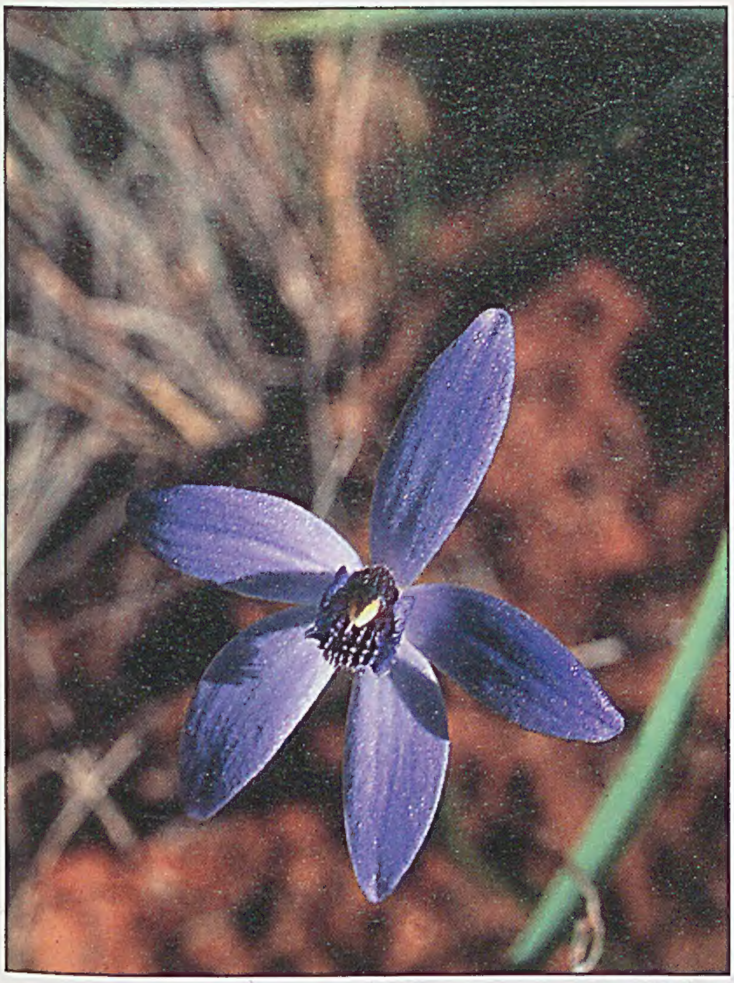
BASKET POTS
200mm x 130mm
140mm x 100mm
80mm x 75mm

ORCHID POTS
300mm x 120mm
250mm x 150mm
200mm x 200mm
200mm x 100mm
175mm x 120mm
150mm x 100mm
125mm x 75mm
120mm x 120mm
100mm x 75mm
80mm x 100mm
80mm x 65mm
70mm x 50mm
50mm x 65mm

21 Jambali Road, Port Macquarie,
NSW 2444 Australia

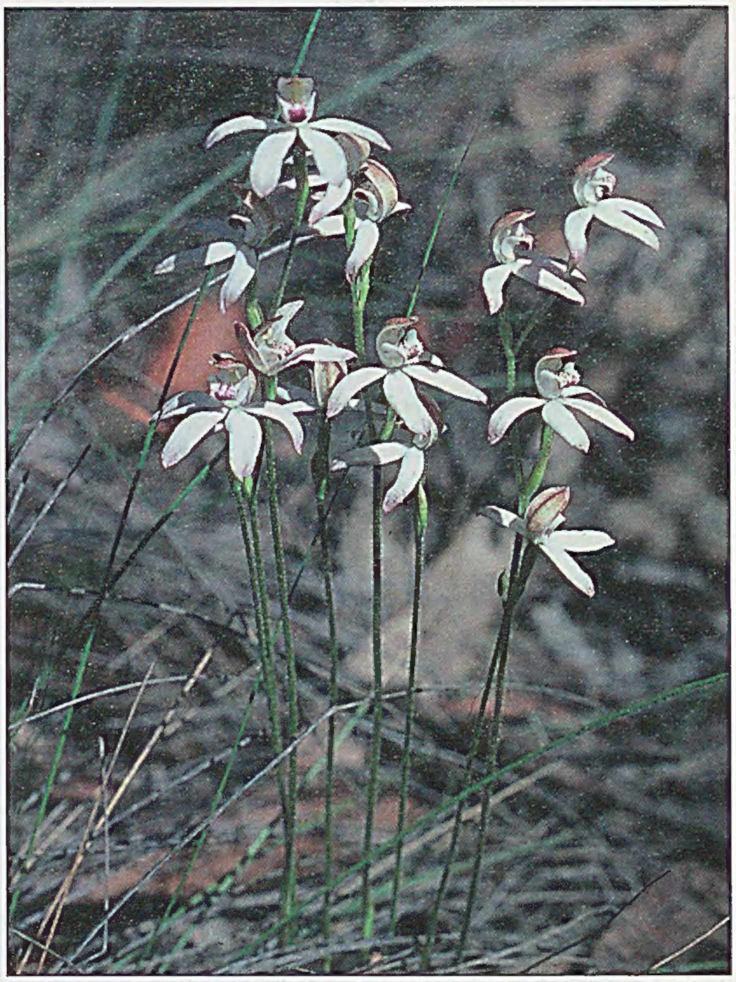
NEW

Phone: (02) 6581 1735 **Fax: (02) 6581 1736**
Website: port.tsn.cc/business/orchidpotco/ Email: orchidpotco@tsn.cc



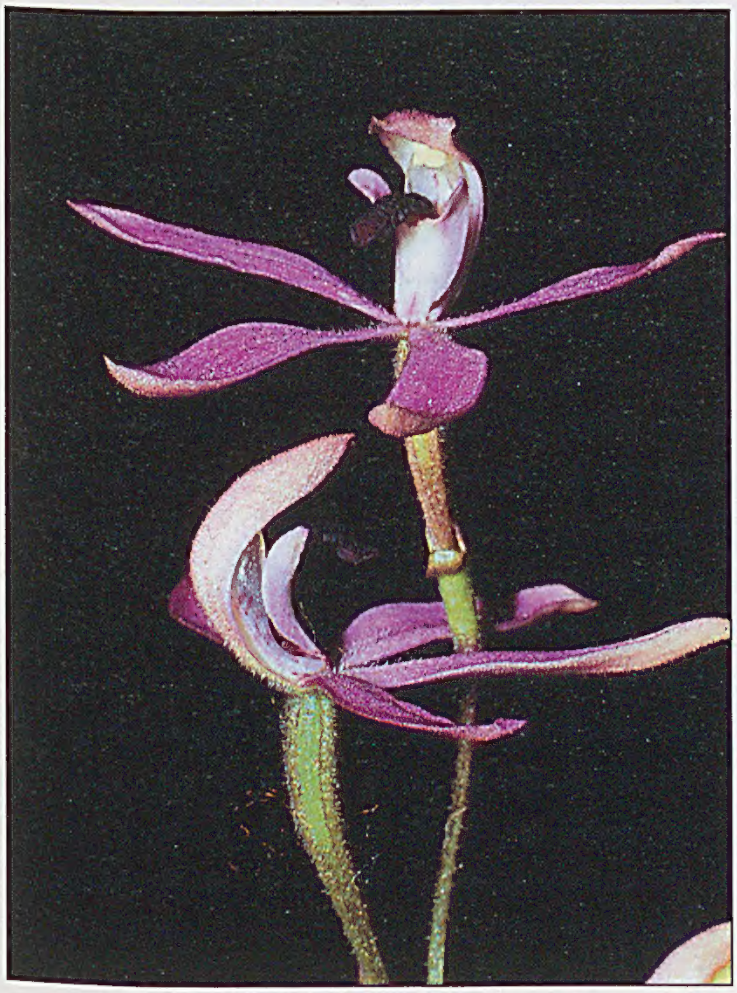
M. Rohlach

Pheladenia deformis
from near Hartley, South Australia



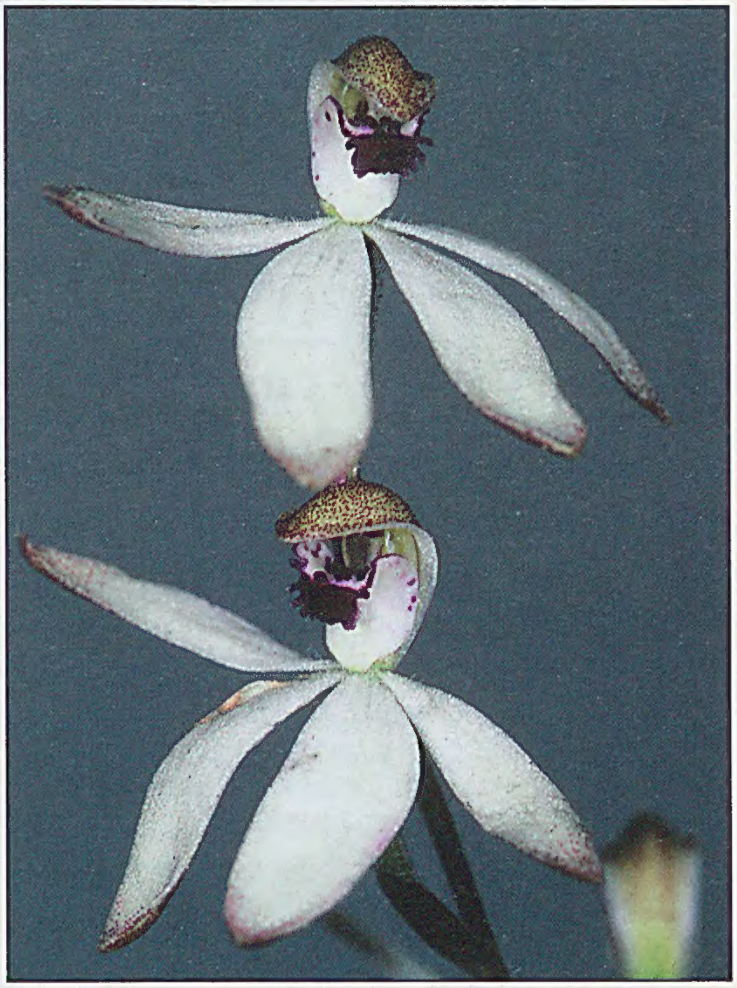
M.A. Clements

Stegostyla gracilis
from near Braidwood, New South Wales



M.A. Clements

Stegostyla congesta
from Red Gum Swamp, Victoria



M.A. Clements

Stegostyla cucullata
from Black Mountain, ACT

ORCHID GLEN NURSERY

N. & K. Russell
26 Mary Street
Dungog 2420
Ring for appointment:
(02) 4992 1291

Specialising in *Sarcochilus* Hybrids
Send S.A.E. for catalogue

SIMPSON ORCHIDS

Native orchids from flask to flowering.
Specialising in Sarcanthinae species
and hybrids.

Flasking service available.
Please send stamp for list.

29 Gannon St.,
Mt. Mee. Qld. 4521

Ph: (07) 5498 2185
Please phone
before visiting.

DOWN UNDER NATIVE ORCHIDS

The home of TROPICOOL™ Hybrids

Specialists in Australian Native
Orchid Species & Hybrids
Plus select Hybrids & Species from
around the globe.
Phena & Brian Gerhard
PO Box 3630 WAMBERAL NSW Australia 2260
Ph: 02 4385 4552 Fax: 02 4385 8330
E-mail: downundr@integritynet.com.au
Website: www.duno.com.au
Contact us for a free catalogue

ORCHIDACEOUS
BOOKS
Specialist supplier of
ORCHID BOOKS

Large selection of new and
pre-owned titles available.
Send now for your catalogue.

Grahame & Margaret Muller
P.O. Box 192, Tinana, Qld, 4650
• Phone 07 4122 1251 • Fax 07 4122 4539
Email: gmuller@mary.big.net.au

AUSTRALIAN DECIDUOUS TERRESTRIAL ORCHIDS

Available as ...
Bare root plants: May - August
Dormant tubers: November - February
Flasks, all year

* * *

Easily grown species and hybrids from a range of genera including: *Caladenia*, *Chiloglottis*, *Corybas*, *Cyrtostylis*, *Diuris*, *Lyperanthus*, *Microtis*, *Pterostylis* and *Thelymitra*.

* * *

Send S.A.E. for listing and cultural notes.

NESBITTS ORCHIDS
PO BOX 72
WALKERVILLE, SOUTH AUSTRALIA 50
Phone: (08) 8261 1550 Fax: (08) 8266 037

MACQUARIE NATIVE ORCHIDS

Specialist breeders of
Australian Native
Species & Hybrids

Michael and Roslyn Harrison
68 Howes Road
Nth. Wilberforce NSW 2756
☎ (02) 4576 3290

Send SAE for full flask list
spection by Appointment
nwharrison@ozemail.com.au

Royal Botanic Gardens Victoria
RBG00025671

TINONEE

ORCHID NURSERY

We stock a large range of Australian native *Dendrobium* and *Sarcochilus* species and hybrids from tube to flowering size.

We deflask and make available to you quality seedlings bred by some of the best hybridisers in the country.

Ray Clement
768 Tinonee Road,
Tinonee, NSW 2430
email: clement@tpg.com.au

Free list available on request

Phone or Fax (02) 6553 1012

- Visitors Welcome -

Dark Star Orchids

FLASKS AND SEEDLINGS

Imported from top breeders in Germany, UK and Thailand

African and Madagascan species Paphs, Lycastes, Vandaceous and more

Rare species and some hybrids

HANS SCHAIBLE
PO Box 114 Bowraville NSW 2449
Telephone/Fax: (02) 6564 4088
email: darkstar@nor.com.au

Australian Orchid Review

edited by David P. Banks
The complete Australian orchid magazine, published bi-monthly featuring:

Australian Orchids	*Fine Photography*
Book Reviews	*Hybrid Listings*
Buyer's Guide	*Latest Hybrids*
Cultural Information	*Nursery Profiles*
Cymbidiums Australia	*Rare Orchids*
Exotic Species	*Show Reports*

One Year (six issues)	**$39.00**
Two Years (12 issues)	**$72.50**
Three Years (18 issues)	**$103.00**

Subscribe to the 'New' *Australian Orchid Review.*

Credit Card Subscriptions may be telephoned to **(02) 9560 6166 during business hours.**
Alternatively, they may be mailed to:

Australian Orchid Review
14 McGill Street, Lewisham, NSW, 2049
email: aor@graphicworld.com.au

AUSTRALIAN ORCHID RESEARCH

AUSTRALIAN ORCHID RESEARCH
VOLUME 3, 1998
Contributions to Tasmanian Orchidology 1-9
AUSTRALIAN ORCHID FOUNDATION

is an occasional publication dealing with the results of scientific research into Australian Orchidaceae. It is published periodically when suitable material comes to hand. All publications are reviewed by at least two botanical specialists and edited prior to publication.

Three volumes have been published to date:-

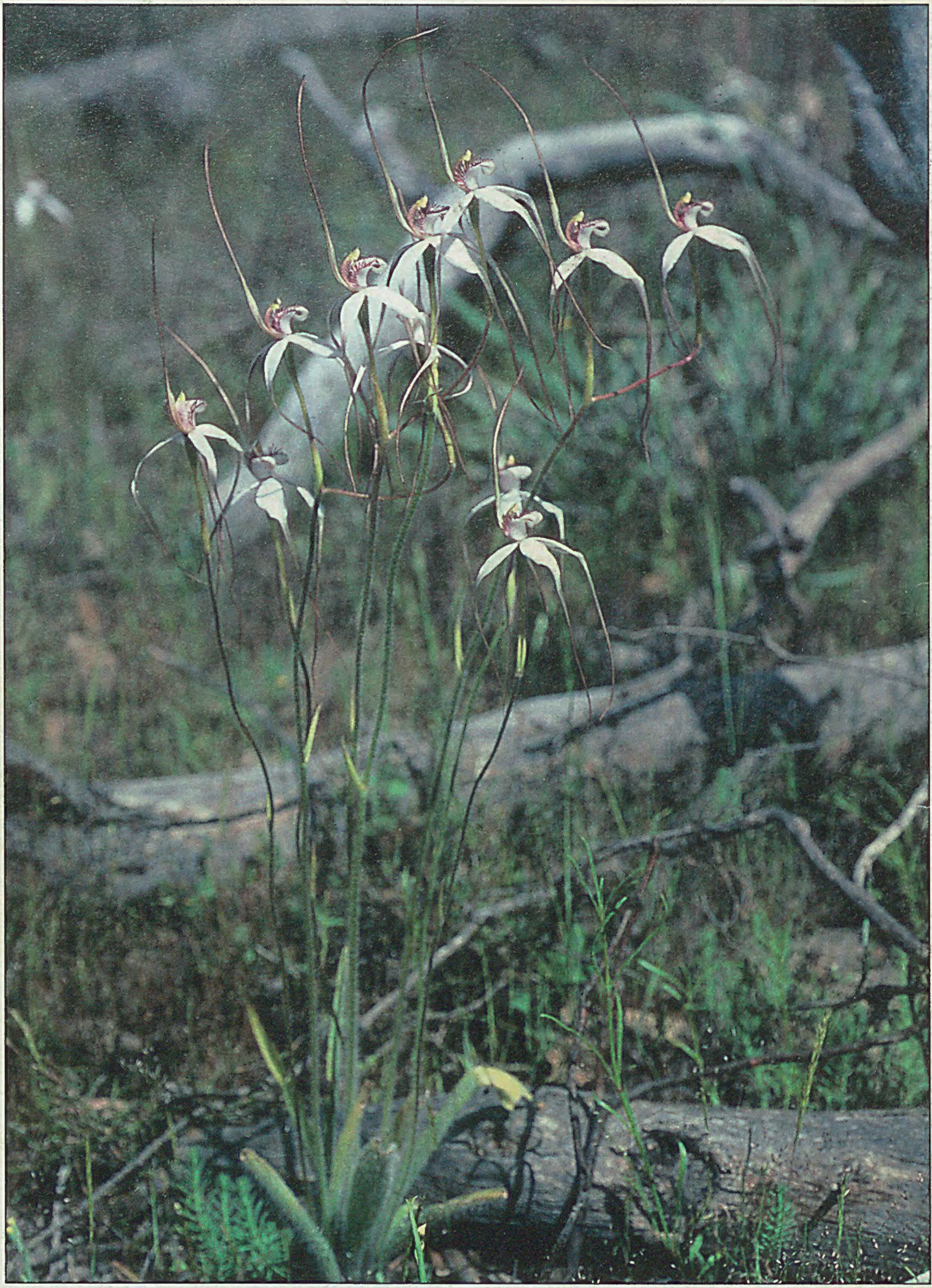
Volume 1, 1989.,
***Catalogue of Australian Orchidaceae*, M.A. Clements.**

Volume 2, 1991.,
***New Taxa of Australian Orchidaceae*, David L. Jones.**

Volume 3. 1998.,
***Contributions to Tasmanian Orchidology*, David L. Jones.**

Copies of
AUSTRALIAN ORCHID RESEARCH
and other publications are available from;

The Australian Orchid Foundation,
107 Roberts Street, Essendon 3040
Victoria, Australia.



M.A. Clements

Arachnorchis longicauda
from Kendenup West, Western Australia

Printed by Gosford Printing Pty. Ltd., Avoca Beach, N.S.W. 2251